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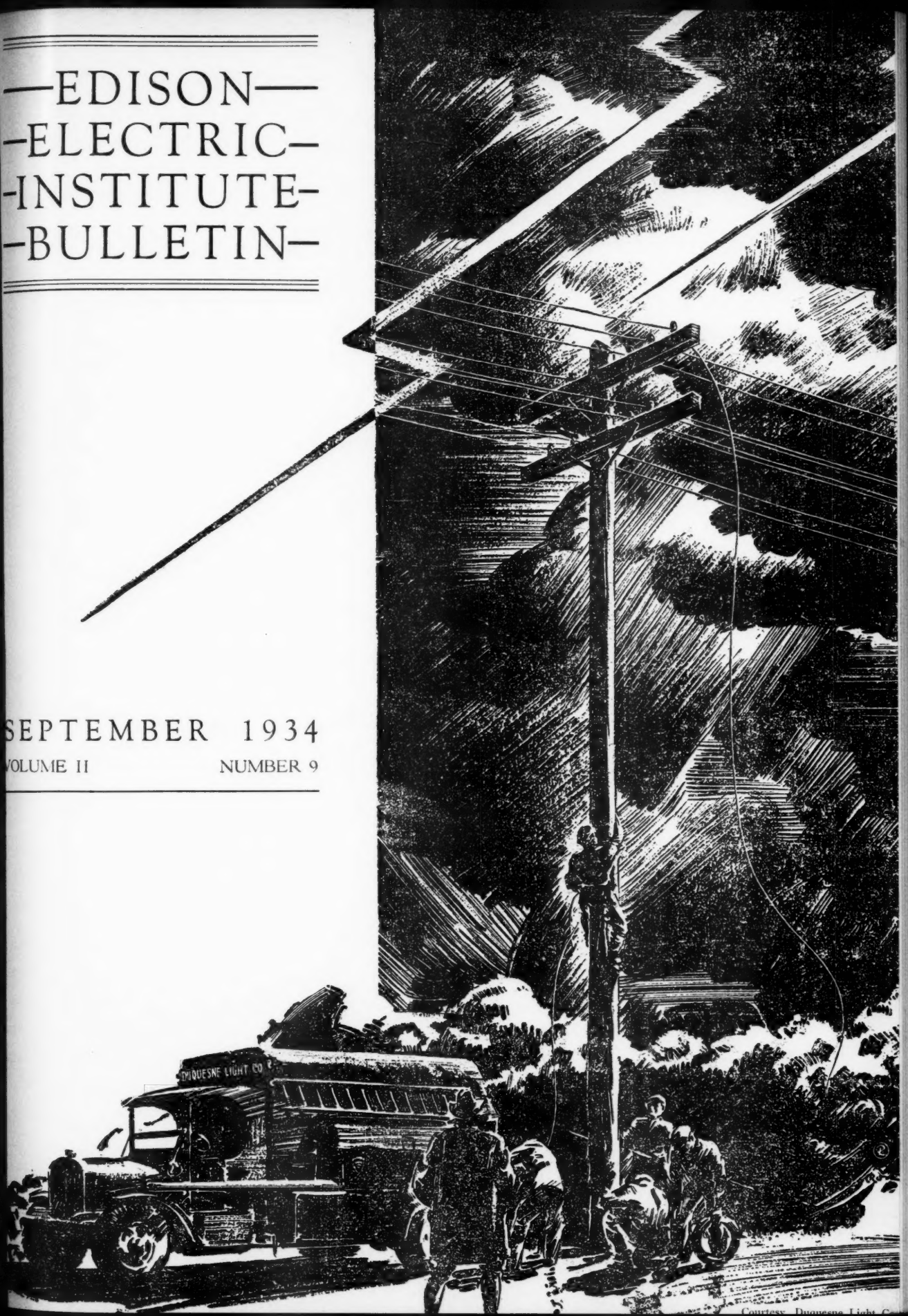

Courtesy Duquesne Light Co.

STATISTICAL DATA OF THE ELECTRIC LIGHT AND POWER INDUSTRY

Compiled Monthly by the Edison Electric Institute—Covers 100% of the Industry

DURING THE MONTH OF JULY

	1934	1933	%
Kilowatt-hours Generated* (net)			
By Fuel	4,712,681,000	4,390,664,000	+ 7.3
By Water Power	2,324,657,000	2,532,667,000	− 8.2
Total Kilowatt-hours generated	7,037,338,000	6,923,331,000	+ 1.6
Additions to Supply			
Energy purchased from other sources	161,404,000	213,954,000	−24.6
Net International Imports	74,868,000	66,364,000	+12.8
Total	236,272,000	280,318,000	−15.7
Deductions from Supply			
Energy used in electric railways departments	46,404,000	47,068,000	− 1.4
Energy used in electric and other departments	110,945,000	97,981,000	+13.2
Total	157,349,000	145,049,000	+ 8.5
Total Energy for Distribution	**7,116,261,000**	**7,058,600,000**	**+ 0.8**
Energy Lost in Transmission, Distribution, etc.	**1,307,955,000**	**1,298,674,000**	**+ 0.7**
Kilowatt-hours Sold to Ultimate Consumers	**5,808,306,000**	**5,759,926,000**	**+ 0.8**
Sales to Ultimate Consumers (kw-hrs)			
Domestic Service	955,691,000	866,876,000	+10.2
Commercial—Small Light and Power (Retail)	1,060,357,000	1,013,208,000	+ 4.7
Commercial—Large Light and Power (Wholesale)	3,211,654,000	3,309,822,000	− 3.0
Municipal Street Lighting	150,464,000	150,296,000	+ 0.1
Railroads—Street and Interurban	324,082,000	301,700,000	+ 7.4
Railroads—Electrified Steam	53,513,000	56,151,000	− 4.7
Municipal and Miscellaneous	52,545,000	61,873,000	−15.1
Total Sales to Ultimate Consumers	5,808,306,000	5,759,926,000	+ 0.8
Total Revenue from Ultimate Consumers	$146,529,400	$143,211,700	+ 2.3

DURING TWELVE MONTHS ENDING JULY 31st

Kilowatt-hours Generated* (net)			
By Fuel	52,386,385,000	45,198,180,000	+15.9
By Water Power	30,692,259,000	31,373,142,000	− 2.2
Total Kilowatt-hours Generated	83,078,644,000	76,571,322,000	+ 8.5
Purchased Energy (net)	3,330,225,000	2,707,349,000	+23.0
Energy Used in Electric Railway and Other Departments	1,985,116,000	1,946,156,000	+ 2.0
Total Energy for Distribution	84,423,753,000	77,332,515,000	+ 9.2
Energy Lost in Transmission, Distribution, etc.	**14,613,174,000**	**14,089,870,000**	**+ 3.7**
Kilowatt-hours Sold to Ultimate Consumers	**69,810,579,000**	**63,242,645,000**	**+10.4**
Total Revenue from Ultimate Consumers	$1,808,943,200	$1,774,993,500	+ 1.9
Important Factors			
Percent of energy generated by waterpower	36.9%	41.0%	
Average pounds of coal per kilowatt-hour	1.45#	1.46#	
Domestic Service (Residential Use)			
Average Annual Consumption per Customer (kw-hr)	617	600	+ 2.8
Average revenue per kw-hr (Cents)	5.37¢	5.55¢	− 3.2
Average Monthly Bill per Domestic Customer	$2.76	$2.78	− 0.7

BASIS INFORMATION AS OF JULY 31st

Generating Capacity (kw)—Steam	23,917,900	24,026,300	
—Water Power	9,006,600	8,975,100	
—Internal Combustion	468,800	461,500	
Total Generating Capacity in Kilowatts	33,393,300	33,462,900	
Number of Customers			
Farms in Eastern Area (Included with Domestic)	(514,016)	(504,220)	
Farms in Western Area (Included with Com'l—Large)	(209,301)	(204,032)	
Domestic Service	20,294,276	19,709,378	
Commercial—Small Light and Power	3,708,465	3,674,819	
Commercial—Large Light and Power	529,715	526,404	
All Other Ultimate Consumers	65,998	62,439	
Total Ultimate Consumers	24,598,454	23,973,040	

*By courtesy of the U. S. Geological Survey with deductions for certain plants not considered Electric Light and Power Enterprises.

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EDISON ELECTRIC INSTITUTE BULLETIN

Volume II SEPTEMBER, 1934 No. 9

ELECTRICITY SUPPLY IN GREAT BRITAIN AND THE UNITED STATES

For the past fifteen years the British Government has taken an active part in electrical development in Great Britain. Lately the United States Government has also assumed an active role in power development. It is the purpose of this discussion to review very briefly the early history of electricity supply in the United States and in Great Britain, to point out a few comparisons between electrical development in the two countries, and to contrast the policies being followed in this field by the British Government with those now being undertaken by the United States Government.

The difference in size between Great Britain and the United States is a basic factor affecting the extent to which the general government in each case exercises control over local affairs. Because of the relatively small size of Great Britain, the British Government is about as close to the affairs of its communities, corporations and individuals as are the state governments in this country to such bodies. The area of Great Britain is not much larger than that of the state of Minnesota.

Early Electrical Development in the United States

Fifty-five years ago, when the supply of electricity to the public began to be a business in the United States, according to the laws and practices of this country, companies were incorporated under state governments and received franchises for the use of public streets from individual municipalities, which in turn made such grants under authority received from the state governments. This power to grant franchises gave each community a large degree of control over the operations of the company serving it with electricity. In the course of 20 to 30 years, in most of the states, a part of this local control was taken away from the municipalities and placed in the hands of state public service commissions. Under both types of control and subject to suitable regulations to protect the public interest, electric light and power companies were left free to effect consolidations and affiliations and thus to make their operations conform to developments in the art of electricity supply and the resulting changes in the economics of the business. At the end of 50 years of growth the total consumption of electricity in the United States had reached an amount almost equal to the consumption of electricity in all the rest of the world combined. Most of this growth took place under private operation. Although many municipalities had entered the power business, a total of nearly four thousand at one time or another having done so, at the end of 1932 privately operated systems were generating 95 per cent of the electricity produced in the country and were selling to ultimate consumers about 94 per cent of the total sold.

Early Development Retarded in Great Britain

The history of electrical development in Great Britain was quite different. Early legislation tended largely to restrict the initiative of private enterprise, and for many years to retard electrical growth in that country. The granting of charters was under the British Government. The General Lighting Act of Parliament of 1882 contained the following restrictive provision:

". . . No local authority, company or persons shall by any contract or assignment transfer to any other company or person, or divest themselves of any legal powers given to them or any legal liabilities imposed on them by this Act, or by any license, order or special act, without the consent of the Board of Trade."

The Act was amended in 1888. Again in 1899 it was restated to read as follows:

"(1) The Undertakers shall not purchase or acquire the undertaking of or associate themselves with any company or persons supplying energy under any license, Provisional Order or Special Act, unless the Undertakers are authorized by Parliament to do so."

In commenting on this first Electric Lighting Act, the London *Times*, in an editorial of Dec. 5, 1933, stated:

"That measure cannot be acclaimed as a triumph of legislative foresight. Indeed, with the limited length of tenure and other restrictions it imposed on the investment of capital in electrical enterprises, it thwarted rather than encouraged the growth of a nascent industry. Some of its most oppressive provisions were modified by the second Electric Lighting Act in 1888, and various measures passed in subsequent years did something to improve the conditions of electric supply. On the whole, however, it cannot be said that Parliament took a broad and enlightened view of the problem, and at the end of the first decade of this century the Council of the Institution of Electrical Engineers declared that the backward condition of this compared with other countries in respect of the practical applications of electrical science was largely due to the restrictive character of the legislation governing the initiation and development of electrical power and traction undertakings and to the powers of obstruction granted to local authorities."

The effect of this restrictive legislation was further pointed out in a report in 1918 by a committee appointed by the Board of Trade of the British Gov-

STATISTICAL SUMMARY OF ELECTRICAL SERVICE FOR THE UNITED STATES

	1922	1927	1929	1930	1931	1932
Kwhr Generated and Purchased (millions)	45,000	73,911	90,277	89,467	86,064	77,442
Kwhr Sold to Ultimate Consumers (millions)	36,500	61,251	75,294	74,906	71,901	63,764
Domestic	3,825	7,676	9,773	11,018	11,738	11,987
Commercial retail (small light and power)	6,800	10,766	13,106	13,944	13,544	12,932
Street lighting	5,700	1,741	2,038	2,227	2,330	2,364
Street and interurban railways		5,039	5,049	4,997	4,549	4,175
Steam railroads		504	590	591	626	540
Commercial wholesale (large light and power)	20,175	35,263	44,326	41,621	38,451	31,186
Number of Consumers (Average of Year)	13,000,000	21,040,834	23,650,218	24,351,457	24,412,424	24,282,423
Average Sales per Consumer	2,807	2,911	3,184	3,077	2,945	2,626
Annual Sales per Capita	332	507	613	604	576	508
Number of Enterprises	6,355	4,335	....	....	....	3,429
Number of Generating Plants	5,444	4,801	....	....	....	4,339
Installed Capacity (thousands of kw)	15,400	24,203	28,390	30,724	32,563	33,335
Average Capacity per Plant, kw	2,829	5,042	....	....	....	7,683
Annual Capacity Factor (generation only)	32.0%	34.5%	36.2%	33.0%	30.0%	26.4%

* "Total Energy for Distribution"

ernment to consider the question of electric power supply. This committee stated, "Seventy undertakings were supplying Greater London from 70 different generating stations, using 50 different types of systems, 10 different frequencies and 24 different voltages." In a report in 1926, a second committee appointed to review the national problem of the supply of electrical energy, commented on this same point as follows:

"As shown by the earlier committee, the parochial policy of generation which today permits the existence of 572 authorized undertakings, owning 438 generating stations, definitely ignores the technical considerations essential to cheap generation. Of the 438 generating stations owned by authorized undertakings, not more than about fifty can be regarded as being of really suitable size and efficiency. Twenty-eight stations generate 50 per cent of the total energy, while 322 stations between them only account for 11 per cent. The percentage of standby plant is unduly high and the load factor is unreasonably low. Interconnection is not carried out as a definite policy. These technical considerations have been continually subordinated to other interests, and the resultant loss to the country has been heavy and becomes daily heavier."

Under the conditions that obtained in Great Britain, public authority undertakers (municipal ownership enterprises) became a larger factor than was the case in the United States. In 1932 the public authority undertakers sold 63 per cent and company (private) undertakers 37 per cent of the electricity sold to consumers, as compared with 6 per cent for municipal enterprises and 94 per cent for privately operated systems in the United States.

A table published in the 1926 report of the committee previously referred to, showing the relative position of Great Britain in the use of electricity, gave a definite measure or "yardstick" of the long term effect of legislation designed to protect the public interest but restricting private enterprise. This table showed that the consumption of electricity per capita in Great Britain at that time was only 110 kilowatthours per annum in contrast to corresponding figures for California of 1200 kilowatthours, for Chicago of 1000 kilowatthours, for Canada of 900 kilowatthours, for the Northeast States of the United States of 800 kilowatthours, and for the United States as a whole of 500 kilowatthours.

Power Supply for Industry

The high rates for and the inadequate supply of central station power available for industry in Great Britain during the World War was one of the principal factors to cause the British Government to concern itself directly with electrical development. A large number of small municipal plants were supplying much of the urban areas. Most of the existing industrial establishments generated their own power supply and new industrial plants found it necessary to do the same thing. The condition tended to perpetuate itself. This was in contrast to industrial development in America where power rates offered by central station companies had encouraged a large percentage of industry to scrap isolated plants and buy from the central stations, a practice which tended to increase the availability to industry over wide areas of a low priced and adequate supply of power. The first annual report of the British Electricity Commissioners for March 31, 1921, commented on this situation as follows: "These factors have reacted adversely on the application of electrical energy for power purposes in industry, and owing in many cases to the small size and high running costs of public stations, manufacturers have been compelled in the interests of their business to adopt the unsatisfactory course of installing their own generating plant, thus extending the wasteful system of generation on a small scale in a multiplicity of small stations."

Steps Taken to Catch Up

The more important steps taken by the British Government to offset the retarding effect of its existing laws and to enable electrical development in Great Britain to catch up with such development in other countries have included the creation of an Electricity Commission in 1919 and, in 1926, the creation of a Central Electricity Board. The Electricity Commission, consisting of five members, was granted powers to set up electricity districts by merging the operations of groups of electricity supply undertakers, whether public authority or company or both. The power supply of such districts was to be governed by joint electricity authorities, which were granted power to acquire generating stations and transmission lines. Three such joint electricity districts were established. The Electricity Commissioners were charged with other duties designed to promote electrical development.

Dissatisfied with the rate of progress then being achieved, there was created in 1926 a Central Electricity Board of eight members with powers to construct and own a transmission system interconnecting the distribution systems of authorized electricity supply undertakers, to select the more efficient generating stations to carry the electricity load for this system, to shut down less efficient generating stations, to minimize

STATISTICAL SUMMARY OF ELECTRICAL SERVICE IN GREAT BRITAIN—AUTHORIZED UNDERTAKERS ONLY

Fiscal Year*	1920-1921	1924-1925	1927-1928	1929-1930	1930-1931	1931-1932	1932-1933**
Kwhr Generated and Purchased (millions)	4,364	6,294	8,628	10,623	11,160	11,691	....
Kwhr Sold to Ultimate Consumers (millions)	3,512	5,097	7,003	8,666	9,074	9,501	10,097
Lighting and domestic	582	1,038	1,708	2,344	2,744	3,072	....
Public lighting	49	81	114	144	164	183	....
Traction	377	447	644	770	794	811	....
Power	2,505	3,532	4,538	5,408	5,371	5,436	....
Number of Consumers	....	....	2,599,617	3,472,043	4,012,188	4,646,486	....
Average Sales per Consumer	....	....	2,694	2,496	2,262	2,045	....
Annual Sales Kwhr per Capita	82	117	158	195	203	212	224
Per Cent of Houses Wired	....	....	....	....	....	....	44
Number of Authorized Undertakers	473	541	620	657	663	660	650
Public Authority (Municipal, etc.)	270	305	355	369	385	387	385
Private	203	236	265	288	278	273	265
Number Generating Entire Supply	336	301	285	256	223	195	....
Number Purchasing Entire Supply	60	121	201	243	264	281	....
Number of Generating Plants	....	494	490	500	483	464	474
Installed Capacity (Thousands of Kw)	....	3,724	5,258	6,600	6,946	7,195	....
Average Capacity per Plant, Kw	....	7,540	10,730	13,200	14,380	15,500	....
Annual Capacity Factor	....	18.5%	18.3%	18.0%	18.0%	18.3%	....

* Fiscal year ends March 31st for Public Plants; previous December 31st for Private Plants.
** Year ending December 31, 1932.

duplication of generating facilities by authority to approve or disapprove plans for the erection of new or extension of existing generating stations, and to effect a standardization of the frequencies and other electric current characteristics of the many separate supply systems. It was contemplated that this Central Electricity Board would not own generating stations nor would it engage in the distribution of electricity. It would, however, own the interconnecting transmission system or grid as it has come to be called.

The British Grid

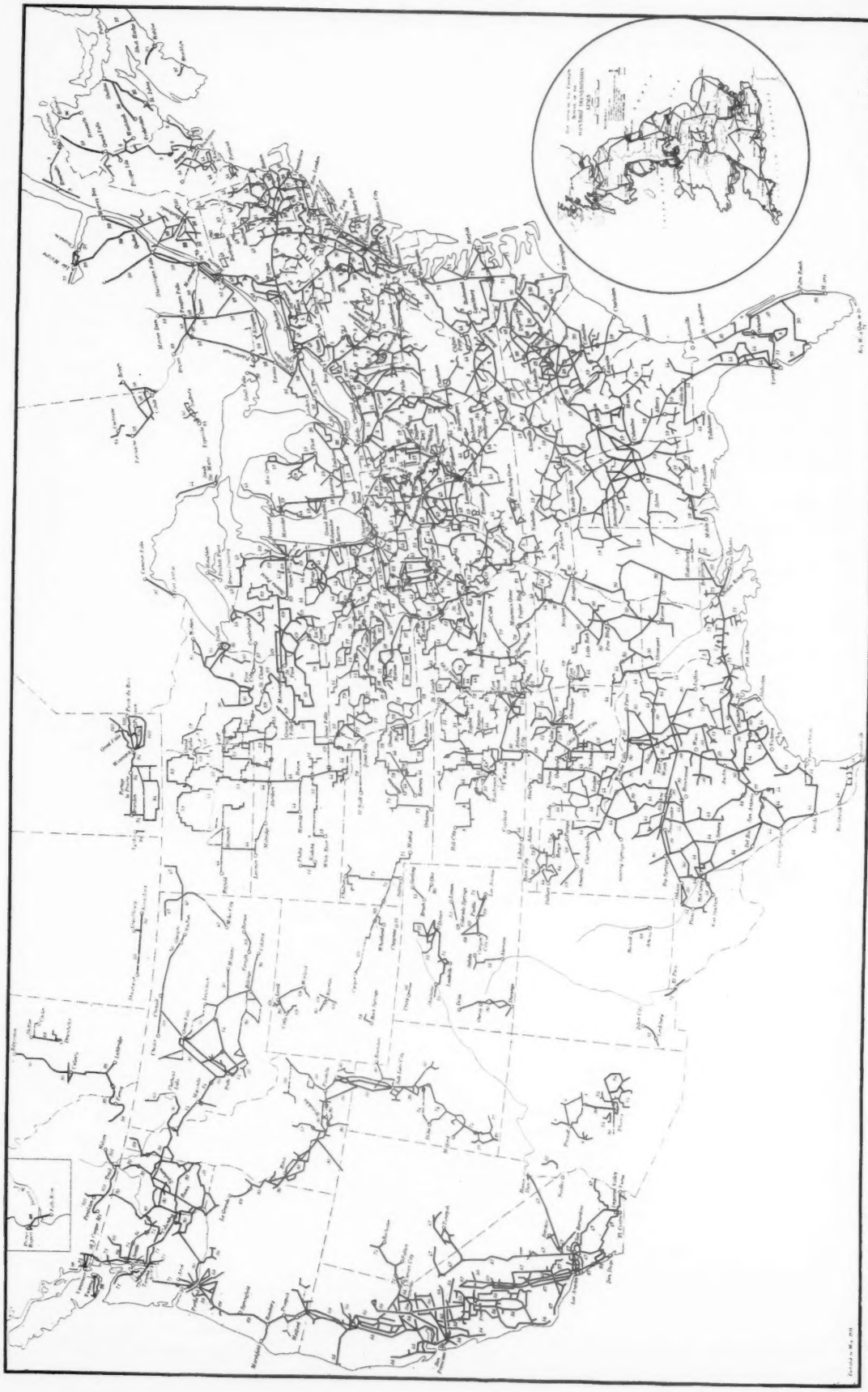
The British Grid is a scheme of interconnection available to some 650 separate electric light and power enterprises in Great Britain. At present it covers England and Wales and southern and central Scotland and is within reach of about 98 per cent of the 45 million inhabitants. The large interconnected power systems in the United States which had been developing for the past 20 or 30 years were carefully studied by committees of the British Government prior to and during the construction of the Grid, and to a considerable extent it was modelled after these systems. The 1926 committee previously referred to stated, "We have had the benefit of the experience of Mr Insull of Chicago and Mr Alex Dow of Detroit, and we find that in America the great supply systems have developed the business of selling electricity into a very fine art with the result that there has been a rapid increase in the consumption of electricity per head of population."

A large number of small isolated power systems had been perpetuated by law in Great Britain and it seemed advisable for the British Government to step in itself and carry out what, up until that time, it had stopped its subjects from doing of themselves. Construction on the grid system began in the central Scottish area in 1928. This area was completed and brought into operation April 30, 1930. By the end of 1931 some 910 miles of transmission lines were in actual operation in the central Scottish, central England, mid-east England and southeast England areas. Tariffs were announced and general commercial operations started on Jan. 1, 1933, in the mid-east area, and on Jan. 1, 1934, in southeast England, east England, northwest England and north Wales areas. The last tower in the original plan was erected in September, 1933, and with the announcement of a grid tariff for the central England area on April 1, 1934, the essential parts of the entire grid system were practically completed.

Rapid progress has been made during the past 12 years or so in Great Britain in catching up with electrical development elsewhere, as is clearly shown by comparing statistics published in the annual reports of the Electricity Commissioners. The table above summarizes some of the basic data reported, and the table on the opposite page shows such comparable statistical data as is available for the United States.

The much greater density of population in Great Britain and the large percentage of yet unwired homes and of industrial plants not yet connected to central station lines, are factors favorable to still further large growth in the electric light and power industry in Great Britain. The per capita use of electricity is still only about two-fifths of what it is in the United States. About 98 per cent of the homes in Great Britain are within reach of distribution lines and yet, according to the latest information, only 44 per cent of its homes are wired for electricity. In the United States 70 per cent are wired and with few exceptions the remaining 30 per cent are not served because of the factor of isolation. In the areas of denser population practically all homes are wired. The density of population in Great Britain is 505 persons per square mile, and in the territory served by the British Grid is about 600 persons per square mile. The density of population in the United States is 42 persons per square mile of land area. For the area east of the Mississippi River it is 100 persons per square mile. Only in the states of New Jersey, Rhode Island and Massachusetts is the density of population comparable to that of Great Britain.

A factor offsetting the advantage of density of population in the matter of electrical development is the relatively low purchasing power of a large part of the British population. According to reports, only 33 per cent of the homes of the poorer classes are wired. Balanced against this low purchasing power, however, is the fact that low labor and material costs give lower capital and operating costs for electricity supply undertakings.



Source of Data for U. S. Interconnections—The Annalist—New York Times Pub. Co., New York
Source of Data for British Grid System—Central Electricity Board, London

Fig. 1. Present Interconnected Electric Transmission Lines in the United States and Portion of Canada
In Circle, to Same Scale—The British "Grid" System

Operation of the Grid

The completion of the grid system is too recent to show how it will work out as a practical operating unit. It covers an area of 67,632 square miles and comprises 3000 miles of transmission lines above 66,000 volts and 1540 miles between 33,000 and 66,000 volts. In the United States there are 64,000 miles of transmission lines with a voltage of 66,000 or more and 75,000 miles of transmission lines between 30,000 and 66,000 volts. There are many interconnected systems in the United States covering areas comparable in size to Great Britain, particularly in New England; in the area comprising eastern Pennsylvania, New Jersey and Maryland; in western Pennsylvania, West Virginia and Ohio; in the Chicago area; the Minneapolis area; the St. Louis area; in the territory of western Virginia, West Virginia, Kentucky and Tennessee; in the Carolinas; in the Southeastern States; and in California. A company in California operating as a single system, the Pacific Gas and Electric Company, covers 35,000 square miles. The Northern States Power Company, operating in six states surrounding Minneapolis, covers in a single system 30,000 square miles.

It is apparent from the physical design of the Grid and from the manner in which it is operated and used, that it was intended to be and is a series of local networks serving definite industrial areas, which are, however, interconnected as between the several areas. Not only do the Grid tariffs differ among the various area schemes, but the mode of operation and the actual movements of power show that the operations of the Grid are confined essentially within the areas. As a matter of fact, Sir Archibald Page, general manager of the Central Electricity Board, has stated,* "The Grid is not intended for the transmission of large blocks of energy over long distances," and again in the same paper, "It [the Grid] is therefore being built up in sections in accordance with district schemes . . . the sections in each district will be operated as one or more units and provision is made for interconnection between the districts."

Figure 1 shows a transmission line map of the United States and in the circle, to scale, is shown the British Grid System. Figure 2 is an enlargement of the Grid map.

In some respects progress in development in Great Britain since the appointment of the Electricity Commissioners in 1919 has been slow. According to comments in the technical press and as indicated by the figures in the preceding table, industrial plants have been slow to purchase central station power. After 14 years but three joint electricity authorities have taken over the supply of power for an enlarged district, and the number of authorized establishments at the end of 1932 was about 40 per cent greater than it was in 1920. It also appears that rather slow progress has been made in obtaining the objective of shutting down generating plants. The number in 1932 was equal to the number in 1922, although the installed capacity per plant had doubled, showing that the new plants being constructed are larger. The increase in the number of establishments purchasing their entire supply of power was from 60 in 1920 to 281 in 1932, which shows that the smaller and less efficient generating stations are gradually being shut down.

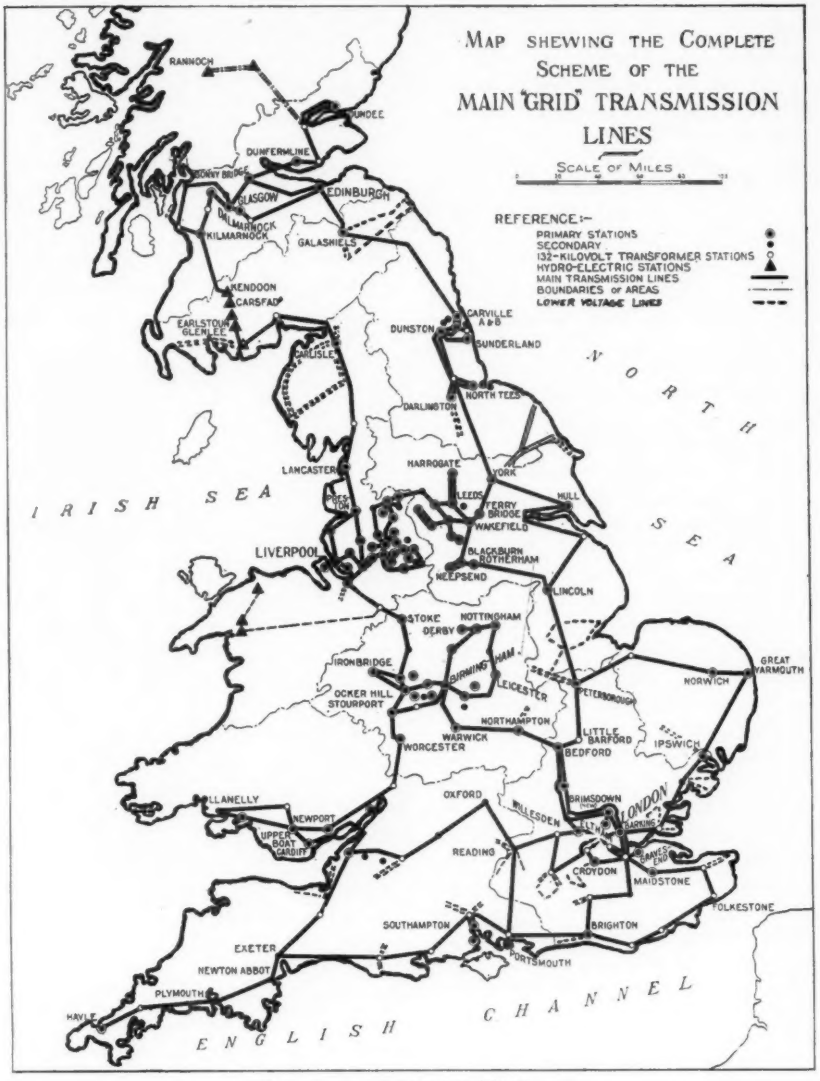


Fig. 2. The British "Grid" System
Enlargement of map shown in circle in Fig. 1

Tariffs

Tariffs for the sale of electricity in Great Britain are of interest principally on account of their form. Direct comparisons of tariffs there with rates in the United States on a monetary basis, according to a rate of exchange that is shifting from time to time, have limited value. To be of any real use such comparisons of rates existing between two countries would require a careful weighting of such factors as prevailing standards of living, wage levels,

*At World Power Conference, Berlin, 1930.

Fig. 1. Present Interconnected Electric Systems—The British "Grid" System *In Circle, to Same Scale*

relative fuel costs, cost of money, general costs of doing business, etc. From published labor statistics, it would appear that the average wage level in Great Britain is about half the wage level in the United States at prevailing rates of exchange. Although amounts of rates are not directly comparable, the form of rates is something that can be compared.

In Great Britain there is widely available a flat lighting tariff for the small user. This tariff varies in amount from 5 pence to 8 pence or approximately 10 cents to 16 cents per kilowatthour. There is also available in many areas an optional tariff variously called the "two-part" tariff or "all-in" tariff. It is designed to promote greater use of electricity.

This optional tariff consists of a fixed or service charge payable weekly, monthly or, more generally, quarterly in advance, and an energy or kilowatthour charge. The fixed service charge is designed to "provide sufficient revenue to cover all the standing charges incurred in giving the supply to the consumers on the multi-part tariff." It insures the fact that each customer shall pay a fair share of the cost of rendering electric service. The amount of this charge in Great Britain is based on one or more factors, which are assumed to give an approximate measure of the kilowatts of installed capacity in current consuming devices on the customer's premises. The charge is based on (1) the rateable value of the house, or (2) the size of the house, or (3) the number of lamps. All three of these bases are contained in some rate schedules. (The rateable value of houses in England is approximately their annual rental value less annual cost of upkeep and taxes.) The practice of basing the fixed or service charge on the rateable value of a house is very common in Great Britain.

The service charge is a substantial part of the total charge in most of the two-part tariffs offered by electricity supply undertakers in Great Britain. From an examination of such tariffs in various districts, it would appear that this charge varies from a minimum of about 3s a month in a very small house in certain areas to 8s or 12s a month in the average sized house in some areas, or from 75c to $2 or $3 a month. The kilowatthour charge or energy charge would appear from examination of a number of rate schedules to vary from ½d to 2d or from 1c to 4c per kilowatthour. In 1933 one joint electricity authority operating in the London area reported that one-fifth of its domestic customers were on the two-part tariff. Four-fifths were on a flat tariff of 10c to 12c per kilowatthour. This statement and the report that two-thirds of the poorer class homes are not yet wired for electricity, indicate the limited extent of use of electricity among a large per cent of the population in certain areas.

ELECTRIC LIGHT AND POWER PLANTS

AVERAGE COST OF ELECTRICITY TO VARIOUS CLASSES OF CONSUMERS—GREAT BRITAIN AND THE UNITED STATES

Great Britain* Cost per Kwhr, Cents					United States Cost per Kwhr, Cents				
Fiscal Year	Lighting	Power	Traction	All Sales	Fiscal Year	Lighting	Power	Traction	All Sales
1924-25	8.52	2.17	2.63	3.55	1924	5.70	1.60	1.02	2.74
1925-26	7.76	2.03	2.30	3.35	1925	5.74	1.50	0.99	2.74
1926-27	7.29	2.32	2.38	3.57	1926	5.55	1.50	0.97	2.71
1927-28	6.89	1.91	2.01	3.15	1927	5.45	1.47	0.96	2.71
1928-29	6.17	1.74	1.78	2.93	1928	5.37	1.41	0.94	2.66
1929-30	5.81	1.66	1.64	2.81	1929	5.13	1.38	0.93	2.57
1930-31	5.42	1.65	1.57	2.81	1930	4.97	1.42	0.93	2.66
1931-32	5.16	1.60	1.48	2.76	1931	4.92	1.48	0.94	2.75

* *Fiscal Year* in Great Britain; ends 31 Mar (or 15 May) for Public Authorities; previous 31 December for Companies.
Average Cost per Kwhr sold; English pounds converted into U S Dollars at the rate of $4.875 per pound.

Rates in the United States

More recent rate practice in the United States is different from that in Great Britain. A factor in this is the per cent of wired homes. In the United States nearly all residences within reach of distribution lines are already wired for electric service, but a large percentage of the customers use so little electricity that they are served at a loss. In Great Britain over half of the homes reached by distribution lines are still unwired. In large part these are the homes of the poorer classes corresponding to those served at a loss in the United States.

In an effort to arrive at an equitable basis for charging for electricity to spread the costs fairly among customers, many power companies in the United States have also adopted two-part or multi-part rates containing service charges which may be fixed for all customers or may vary with the number of rooms, or with the floor area of the customer's house, or with the number of outlets, the number of lamps, or according to some other measure of the capacity of the electrical installation on the customer's premises. More generally, however, power companies in the United States have striven to accomplish the purpose of providing an equitable charge for electricity by fixing a higher rate for an initial block of energy with lower prices for additional blocks taken by the customer.

The logic of making each customer pay his fair share of the cost of rendering service is generally admitted, and rates so drawn have had wide approval, but in practice pressure from regulatory authorities and popular demand has often resulted in whittling down or wearing away of service charges or top rates so that the smaller user does not pay his fair share of the cost of rendering service, and the proper economic relation between the service charge, whether it be labeled as such or appears as a high top step, and the energy or kilowatthour charge has become seriously distorted as a general rule. In the matter of electric rates as in the matter of income taxes, the trend in this country has been to favor the small user and taxpayer at the expense of equitable distribution. The part played by the service charge in the British two-part rate is more scientific and equitable than is the recent tendency in rate practice in many sections of this country.

As an overall measure of rates, statistics on the price per kilowatthour sold furnish the best available data. British statistics do not separate out domestic service from service to commercial establishments. These are combined under a heading, "Lighting and domestic supplies." If U S statistics for domestic service and commercial retail service are combined, the figures are not strictly comparable with British figures because the U S figures contain small power loads of less than 50 kilowatts of capacity, which presumably are not contained in the British figures. On the other hand, they do not contain large lighting loads of 50 kilowatts or more, which presumably are contained in the British figures. Subject to these limitations and the general limitations previously referred to, the table shown above

(Continued on page 319)

TAXATION AND LEGISLATION

The Situation in the State of Washington and Its Bearing on the Public Utilities

By FRANK T. POST

President, The Washington Water Power Company

Address at the Nineteenth Annual Convention of the Independent Telephone Association of Washington, Sunnyside, Wash.

Taxation is the urgent question of the present day. Statisticians tell us that the aggregate gross income of the nation and the people in 1930 was 40 billions of dollars and that the aggregate cost of government amounted to 17 billions of dollars, of which 10 billions of dollars were actually paid. Statisticians and economists also tell us that the Federal budget is not being balanced and will not be balanced and that very shortly the Federal debt will be at least 40 billions of dollars. Hence the optimists and the new dealers must admit that for very many years in the future the moneys collected from the people for running the Federal Government and its numerous experiments—directly and indirectly, seen and unseen—will be enormous and a very serious burden upon all business activities. The cost of state and local governments is great and may be greater. At least it will not be reduced unless the taxpayers are alert and take a really positive and militant interest in that subject.

With great pleasure I give you an excellent editorial published in the Seattle *Post-Intelligencer* under date of June 12, 1934:

The Taxpayer Still Pays

"The impressive figure, close to $600,000, which is to be paid to the city up to March 1, 1935, by the telephone company as a settlement of the utility's occupation tax, would have a cheerful effect on taxpayers except . . .

"The money represents a tax payment.

"And the people have learned by bitter experience that taxes just don't grow on trees to be conveniently plucked by the tax-spenders.

"Somewhere along the line, the public pays, either in higher cost of essential services, in higher rents or in higher food prices.

"Whether a tax is called an occupation tax or a processing tax, ultimately it comes out of the customer's purse.

"That is reflected in the fact that 42 per cent of the entire national income produced last year was absorbed by federal, state and municipal spending.

"It is reflected also in the wasting sickness that has made the individual purse so anemic.

MR. POST

"'In this world, nothing is certain but death and taxes,' said Benjamin Franklin years ago.

"And nothing is so certain to increase taxes as waste and mismanagement of public funds.

"Huge tax payments won't make your burden any lighter. They only mean that you will have less money to apply on your tax bill because of the increased cost of living.

"The *ONLY WAY* to reduce your tax bill is to *REDUCE THE COST OF YOUR GOVERNMENT*."

The burden of state and local taxation is not equitably or fairly distributed. Time will not permit of any concrete suggestions as to methods of reducing the cost of government—state and local. I wish, however, to point out a few matters relating to the inequitable distribution of the tax burden.

In our state constitution, framed and adopted in 1889, Article 7, relating to revenue and taxation, provides that the Legislature shall provide by statute a uniform and equal rate of assessment and taxation on all property according to its value in money and prescribe such regulations as shall secure a just valuation for taxation of all property, "so that every person and corporation shall pay a tax in proportion to the value of his, her, or its property," provided that a deduction of debts from credits may be authorized, and also provided that the property of the United States and of the state, county, school districts, and other municipal corporations, and such other property as the Legislature may by general laws provide shall be exempt from taxation.

Manifestly the framers of this constitution could have had no conception of the enormous amount of property which would be eliminated from the tax rolls by virtue of these exemption provisions. They never imagined that practically all of the property used and useful for dock purposes around Puget Sound would be made exempt from taxation. I have no definite idea as to the value of this property, but undoubtedly its value is many millions of dollars.

Ever since statehood a very high percentage of the people of this state have lived in the Puget Sound section and that section has had a dominating influence in our Legislatures. Many years ago they succeeded in getting a bill through the Legislature creating port districts and called them municipal corporations, which they are not, and by virtue of such designation and this constitutional provision the property of these port districts has been exempt from taxation. And the taxes that they should have paid, and have not paid, have of necessity been paid by the farmers, the homeowners, the merchants and other taxpayers, and largely by those who have no economic or sentimental interest in these port districts.

The framers of the constitution could not have imagined that our largest city would own its own transportation system and that system would be exempt from taxation while all other transpor-

tation systems are required to pay taxes. The telephonic art was in its infancy. The first central station for distribution of electric energy was built only seven years before the framing of our constitution, and the framers of the constitution could have had no conception of the development of the uses of electric energy. Today in this state about one-fourth of the revenues obtained from the sale of electric energy is received by the cities and towns having their own electric plants, notably Seattle and Tacoma. Acccording to the budgets filed with the Department of Public Works by the privately owned electric utilities, the 1934 taxes, not including Federal taxes, which they will have to pay, will be $2,936,000 and their Federal taxes will be $600,000. If the city-owned electric light plants were to pay state and local taxes on the same basis as the privately owned systems, they would pay $1,016,000. Seattle alone would pay about $680,000. To that extent the city-owned plants are subsidized by farmers, the homeowners, and other taxpayers in this state. They have to pay the taxes that these cities should pay.

You probably have heard or read some of the numerous speeches that our Governor has made about privately owned utilities and his occasional comments that his home town is making enough profit out of its city-owned electric distribution system so that it can retire bonds at the rate of about $6,000 a year. If the Cheney plant were to pay taxes on the same percentage basis of gross revenue as the privately owned electric plants such taxes would be $6,900 a year. These bonds are not, in fact, being retired wholly by the City of Cheney, but in part by the farmers, the homeowners, and other taxpayers in our state. I mention this solely for illustrative purposes.

All property devoted to business should be on the tax rolls and this includes the city water systems, a subject not often discussed. The farmer may get his water for domestic and irrigation purposes from a well or a spring or a stream, with pipe lines connected thereto. That is his water system and that property is a material factor in fixing the value of his farm. It goes on the tax rolls. There is no just reason why the city dweller should get water for domestic and irrigation purposes from a community-owned system free from taxation. The taxes that the city water systems do not pay must of necessity be paid by the same farmers who pay taxes upon their own water systems and by other taxpayers in the state, including telephone companies and all other industries and businesses in the state.

These inequalities and inequities have been discussed for many years, but nothing has been done about it. One reason therefor is the dominating influence of King County and Pierce County in the Legislature.

In 1929 the Legislature passed a proposed taxation amendment to the constitution, which was adopted by the people in November, 1930. This is commonly referred to as the Classification Amendment. It contains no material changes as to exemptions. The important part of this amendment reads as follows: "All taxes shall be uniform upon the same class of property within the territorial limits of the authority levying the tax and shall be levied and collected for public purposes only. The word 'property' as used herein shall mean and include everything, whether tangible or intangible, subject to ownership. All real estate shall constitute one class." There is a provision that mines and lands devoted to reforestation may be taxed on a different basis.

You will note that the law as it is now, as set forth in this amendment, provides that all real estate shall be taxed on an equal and uniform basis, and other property may be classified and the property in each class shall be taxed upon a uniform basis.

At the regular session of the Legislature an amendment to the exemption provision was introduced which provided that city-owned public utility systems, including water, should not be exempt from taxation. That amendment was sent to a committee and there pigeonholed. Near the end of the session another constitutional amendment as to revenue and taxation, which, in effect, repeals the amendment adopted in 1930, was introduced and adopted without any public hearing or opportunity for discussion. At the extraordinary session in 1933 that amendment was again changed by adding one sentence thereto, and as thus changed will be submitted to the people at the general election in November of this year. If that amendment shall be adopted, the Legislature or the people under the initiative will have the power to do almost anything they please on the subject of taxation. It may be summarized as follows:

1. They may enact a graduated net income tax law without any restrictions as to percentages.

2. No property is specifically exempted from taxation. In that regard the language of the section is, "There shall be such exemptions from taxation as the legislature may by general law provide." In other words, they may or may not exempt city-owned public utility property, church property, or any other property now exempt. They might exempt residential property without limit as to the value thereof, timber lands or wheat lands or orchard lands or any other property that the majority of the legislature body might at any time desire to exempt.

3. One provision is that "all taxes shall be uniform on the same class of subjects." In the constitutional provision adopted in 1930 the provision is: "all taxes shall be uniform upon the same class of property." The word "subjects" takes the place of the word "property."

What does the word "subjects" mean? The dictionary does not give any definition that throws any light upon this question. It is evidently intended to have a broader meaning than the word "property" and is intended to cover any property, privilege, relation, or other thing which under the law may be taxable.

At the 1933 general session of the Legislature an act was passed commonly called an Occupation Tax Law, being Chapter 191. This statute purports to levy a tax upon the privilege of engaging in business activities and provides for a gross income or gross proceeds or gross revenue tax upon numerous occupations and businesses, on different bases, from 3/10 of 1 per cent to 3 per cent, the high percentages applying to light and power companies, telephone and telegraph companies, and water companies.

May the privilege of doing business be subdivided into different classes? This proposed amendment says that all taxes shall be uniform upon the same class of subjects. If you call the privilege of doing business a subject and substitute the expression "privilege of doing business" for the word "subjects," we would have it then read that all taxes shall be uniform upon the same class of privileges of doing business. This seems rather nonsensical, and I call attention to it because if the privilege of doing business, no matter what the business may be, is one subject and not several subjects, and this amendment should be adopted by the people in November, then it would seem that one effect thereof would be the repeal of Chapter 191, known as the Occupation Tax Law, because that tax is not uniform, as the percentages vary from 3/10 of 1 per cent

low to 3 per cent high upon gross profit or gross income.

However that may be, if this amendment to the constitution shall become the supreme law of this state, unquestionably the Legislature would have power to pass a law providing for the assessment of lands on different bases; for example, orchard land at 100 per cent of value, wheat land at 80 per cent of value, pasture land at 50 per cent of value, timber land at 20 per cent of value. Likewise, the Legislature could assess cattle at 90 per cent of value, sheep at 50 per cent of value, hogs at 20 per cent of value, and also, unquestionably, they could assess telephone property at 100 per cent of value, gas utilities at 40 per cent of value, water utilities at 30 per cent of value.

As to electric light and power utilities, one question would be whether the Legislature could classify them according to ownership, that is, whether owned by individuals called stockholders or owned by cities and towns. As under another provision of this section, the Legislature might exempt publicly owned and politically operated utilities, perhaps they could provide that they should be assessed at, say, 50 per cent of value and the privately owned utilities at 100 per cent of value. That would be one of the knotty problems for the Supreme Court to decide.

From this analysis you will see that this proposed amendment contains practically no restrictions upon the power of the Legislature to pass any sort of revenue and taxation laws they may see fit. The doors are thrown wide open. Uniformity and equality are abolished.

The difference between this proposed amendment and an amendment which would repeal all constitutional provisions on the subject of revenue and taxation as applied to laws that the Legislature might or might not make, is not material. In November the question for the taxpayers of this state to decide is whether or not they are willing to throw down all the bars and permit the Legislature to do whatever they please on the subject of taxation, bearing in mind that the major part of the material exemptions are in King County and Pierce County or owned by Seattle and Tacoma, and these two counties have about 40 per cent of the population of this state and nearly 40 per cent of the members of the Legislature and are a potent influence in all other departments of state government. In one important department all of the executive heads have been appointed from Seattle and Tacoma.

Manifestly our constitution should contain a section relating to taxation, which shall state with definiteness what property shall be assessed, and how, and what property may be exempt from taxation. I see no objection to classification of property as provided in the existing section of our constitution relating to taxation. Promissory notes, bonds, shares of stock, and other intangibles should not be assessed on the same basis as real property or tangible personal property. I see no objection to permitting the Legislature to pass a graduated income tax law, nor would I deny them the right to pass a sales tax law, or even an excise tax law more or less like the present very unpopular excise tax statute which some people call a business tax law, but, if so, it should be at a uniform rate and be all-inclusive and deny the right of the cities and towns to duplicate the same in whole or in part.

All property devoted to business should be on the tax rolls regardless of its ownership and the constitution should so explicitly provide. In this connection permit me to refer to an address delivered by Mr. David E. Lilienthal, Power Director of the Tennessee Valley Authority, appointed by President Roosevelt, before the Rotary Club of Memphis, Tenn., delivered on Oct. 17, 1933. I quote a part thereof relating to taxes:

"The item of taxes in public power operations has been the subject of confusion and misinformation and I would like to discuss it for a moment. The principle, as I see it, can be worded in this way: A public power system should bear the burden of taxes which it would pay if it were privately owned. A public power system should contribute its share of taxes to the general fund. This has for years been the established practice in well-managed power enterprises."

In line with this is a recent editorial comment in the Spokane *Spokesman-Review*. I am pleased to read it:

You Pay Seattle's Taxes

"The supreme court decision sustaining the 3 per cent occupational tax on the gross revenues of city-owned public utilities, as well as upon those privately owned, was a step in the right direction. So far as that tax goes, as *The Spokesman-Review* said Tuesday, 'It puts private ownership and municipal ownership upon a square deal competitive basis.'

"But that equalizing principle is yet to be applied to general property taxes. These bear heavily on privately-owned public utilities and their patrons, but such municipal utilities as Seattle's street railways system, its big power and light system, extending into several counties, and its municipal docks, are still exempt, and all that property is off the tax rolls.

"This is a double injustice—first, against the privately-owned competing utilities and their patrons, and then against all property owners outside of Seattle, who are compelled to pay higher state taxes than would be required of them if these city-owned properties were on the tax rolls and contributing their fair share to the costs of state government."

Another ably edited newspaper, the Yakima *Herald*, has some well-expressed comments on this subject in the issue of June 15. I quote a part of this editorial:

Tax-Free Property

"In a recent meeting, the members of the Washington State Taxpayers' Association voted a resolution providing that all property except that used for religious, educational and eleemosynary purposes should be placed on the assessment rolls and be taxed. The resolution was patently aimed at the utilities owned in the state by various units of government and, for that reason, expunged from the tax rolls. All public property, such as municipal light and power companies and public port properties, should help support the state government.

"If anyone in the Yakima Valley objects to this suggestion, let him consider for a moment the effect upon him of the tax-free enterprises in this state. Seattle alone owns and operates public utility plants conservatively estimated at a value of $50,000,000. That sum is larger than the value of all tangible property in Yakima County. Therefore, Seattle escapes payment of an annual tax bill that would equal the sum assessed every year by Yakima County against property within its boundaries. Seattle, of course, is only one of the many jurisdictions operating tax-free property in its own behalf. . . ."

A short time ago the Department of Public Works, in their enthusiasm for the decrease of operating expenses of public utilities, issued an order that none of the moneys paid by the utilities to support chambers of commerce and community chests should be charged to operating expenses. Without commenting on the legality or propriety of this order, the amount involved is mere small change in comparison with what the utilities suffer because these city-owned business enterprises are exempt from taxation. We may confidently expect, I trust, that the Governor and the director of our Department of Public Works will, in the near future, express their approval of the statement made by Mr Lilienthal (which I have quoted) and the thought so ably stated in these editorials.

This state should have a great future. It has a most delightful climate, fertile soil, great waterways, perfect harbors, great natural resources and magnificent

scenery. At the last session of the Legislature a planning council was authorized. The general purpose thereof is the development of the resources of this state. The idea is a good one. However, one cannot overlook the fact that development requires capital, and capital will not go where there is a likelihood of its being confiscated or strangulated. One of the first things considered is taxes and tax laws, and it is important that they shall be definite and certain and very little, if anything, left to the mere whim or caprice of a non-taxpaying Legislature, if any such should be elected.

The election of 1932 and the conduct of the 1933 Legislature are not reassuring. Let me cite two or three of several instances. The Senate (supposed to be the conservative branch) passed an act requiring all notes, bonds, stocks, and other intangibles, including money in the bank, to be assessed and taxed on the same basis as real property. If it had become a law it would have stopped all development and ruined all banks. The Governor, through his patronage power, was able to get it pigeon-holed in the House. A complete moratorium law applying to all notes, accounts, and credits, as well as all mortgages, passed both houses and was vetoed by the Governor.

The public utility statutes passed at the regular session of 1933 Legislature are anything but reassuring to capital and will tend to hamper the development of the material resources of this state. These statutes are the most drastic in this country. As the matter now stands, the utilities are taxed the highest of any industry or business, apparently on the theory that they have, through good management, kept themselves fairly solvent. In the nation as a whole, the 1933 taxes against the electric light and power companies were 44 per cent higher than in 1929. I have not seen the figures as to telephone companies.

A high state official, having no special knowledge of the subject, has undertaken to inflame the public mind by making numerous public addresses stating that the utility earnings are too high and will be reduced.

These new statutes permit, or attempt to permit, the regulatory department to manage the business of several hundred utilities by dictating their expenditures for improvements and betterments and by fixing the salaries and wages of employees. These laws also permit, or attempt to permit, such regulatory department to make frequent and expensive investigations of all of these utilities and charge the entire cost thereof to the utility so investigated. Some of these utilities have untaxed and unregulated competitors and some of our state officials are fostering additional untaxed and unregulated competition. It should be self-evident that the planning council will be unable to accomplish very much, if anything, until our lawmakers and our executives and administrative officers get into a more reasonable and equitable frame of mind. The experience of North Dakota is not ancient history and should be educational.

You are aware that we have a very efficient organization in this state known as Washington State Taxpayers' Association. This association is entitled to the support of all taxpayers. The regular annual conference of this association was held in Seattle on June 1 and 2, and they adopted a platform consisting of 17 planks or points, as published by the newspapers. One of these planks or points reads as follows: "All property of every kind, except that which is used exclusively for religious, educational or eleemosynary purposes not operated for profit should be taxed." That is somewhat broader in its scope than the position I have already stated. I am not criticizing it, but am mentioning it for the purpose of calling attention to the fact that the only property that this association has concluded should be exempt from taxation is property used exclusively for religious, educational or eleemosynary purposes. Unless a definite statement as to what property shall be exempt is set forth in the constitution of this state, the question of exemptions will be a controversial question in every session of the Legislature and there will be initiative measures relating to exemptions frequently submitted at general elections.

Another point, as published, reads as follows: "The 40-mill limit law should be retained and strengthened. All existing mandatory tax levies should be repealed." I think most tax-minded persons who are at all familiar with the laws of this state relating thereto will approve of this point.

Another point reads as follows: "The assessment of real and personal property by townships and levy of road taxes of townships should be abolished." Manifestly that is a correct statement.

Another point I wish to call attention to reads as follows: "A law should be passed preventing municipal corporations from imposing indirect taxes which are in whole or in part a duplication of indirect taxes imposed by the state." I judge the meaning and intent thereof is to prohibit cities and towns from imposing excise taxes, occupation taxes or privilege taxes when the state Legislature has imposed such taxes. In other words, if the state Legislature has imposed a tax of some per cent on gross revenue, as an excise tax or occupation tax, then each city or town should be prohibited from duplicating the same or imposing a similar tax. The power to tax is the power to destroy. The imposition of excise or occupation taxes upon a utility in each city or town in which it operates, when the state, through its Legislature, has imposed such a tax, is extremely dangerous and may be ruinous to the utility.

It is a fact which seems not to be very well appreciated by officeholders, who spend the taxpayers' money, and perhaps not very well appreciated by the public generally, that the interest of the investor and the consumer is practically the same. They are quasi-partners. The consumer desires to have from a public utility the best possible service that can be obtained and at reasonable rates. First-class service cannot be given by any public utility unless the investor is permitted to have a reasonable profit upon his investment. If, through taxation or otherwise, the investor is deprived of a reasonable profit, the public utility plant will not be developed and properly maintained and the service will be impaired. This is fully recognized by the Public Service Commission law, which states that rates for service shall be fair, just, reasonable, and sufficient. The word "sufficient" is just as important a word as the word "reasonable." In other words, the compensation to be paid by the consumer for the service rendered must be sufficient to give to the investor a fair profit upon his investment. If such profit is taken away by taxation or in any other manner, the consumer is injured, because his service will be impaired.

And there is another principle that cannot be set aside or affected by tax legislation; viz, the utility gets its money with which to pay taxes from its customers, and excessive taxes eventually must be reflected in its rates.

Dorsey Hill and other members of the Washington State Taxpayers' Association took a trip around the state a short time ago and made speeches in several towns. One of the things that they emphasized in these addresses was

(Continued on page 317)

THE BETTER HOUSING PROGRAM
How the Utility Industry Can Tie In

By C. E. GREENWOOD

Commercial Director, Edison Electric Institute

Why The National Housing Act

It was Sir Edward Coke that wrote in his "Institutes," "A man's home is his castle." From time immemorial home has been the stronghold of family stability and the cornerstone of community building. And so much romance has been wrapped up in the building and owning of a home!

In recent years, thousands of these American "castles" have been beset with many practical troubles, none the least of which have been the problems of paying taxes, paying mortgage interest, paying for repairs and improvements. Men and women have fought legal and political battles, and suffered many privations to retain this prized possession. The first two calls on the exchequer—taxes and interest—have drained its reserves so that repairs and improvements could only be thought of in terms of longevity of the owner.

The sunny side of the picture is what the writer means to stress, but he ran pell mell into somewhat distressing statistics from the Real Property Inventory of the Bureau of Census.

Of 1,257,149 residences examined in but 53 cities of the U.S.A., 770,535 or 61 per cent, we learn, need repair. Although man at forty is just in his prime, a house forty years old is assumed to be in the groggy class and at least needs revamping to be placed in the modern grouping. It appears that there are 177,521 among these structures examined that are over the forty-year mark.

As an example, in the town of Williamsport, Pa., there were 8,459 houses examined under the CWA Survey, and 6,338 were over forty years old; 2,541 had no tubs or showers, 1,062 no indoor toilets and 684 no electricity or gas.

The total U.S.A. Survey covered 640,830 houses in selected locations, and of this number 377,574 need repairs and improvements.

In the multi-family group, 1,625,096 dwelling units were examined. The electric utility had done a good job in installing wiring and lighting in 1,455,626, or 90 per cent of this group. But only 6 per cent had electric cooking and but 17 per cent mechanical refrigeration. At least 25 per cent had no bathtub or

A Fine Example of an All-Electric Kitchen—Better Housing Program Funds Are Available for Financing Built-In Electrical Kitchen Equipment

ELECTRICITY IS CHEAP

The Better Housing Program, sponsored by the United States Government, enables property owners to finance repairs and improvements at LOW COST. An essential is

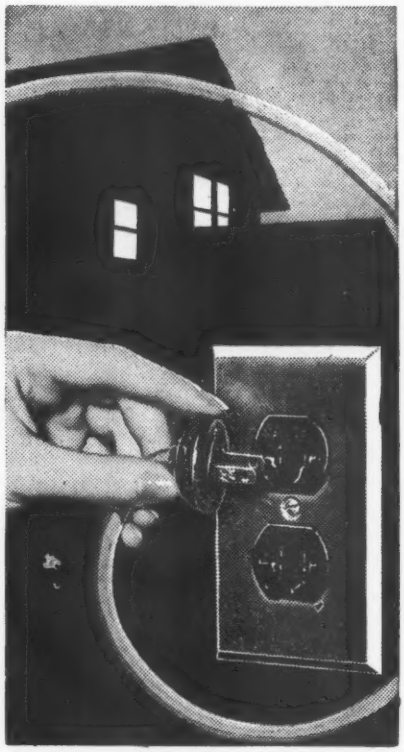
ADEQUATE WIRING

THE National Housing Act was designed to help you improve your property and increase its value, its comfort, and its usefulness. Through one of the simplest and most reasonable systems of financing ever devised, the Act makes it possible for you to make delayed repairs and provide better surroundings for your family.

Proper and adequate wiring is an important part of the Better Housing Program, and we are ready to advise you and help you plan proper wiring for your home. This service is absolutely free.

Take your living room for example. Are the lighting fixtures up to date? Do you have an efficient ceiling fixture? Do you have enough outlets, or do you have to keep changing wires for this lamp and that lamp? Do you have an outlet for your radio? Do you have a convenience outlet for your portable electric heater and electric vacuum cleaner? Is there a light near your telephone stand, or do you have to carry the phone book across the room to find a number? You will be surprised to learn how little these electric conveniences cost.

We, or your electrical contractor, will be glad to advise you and help you plan electrical improvements for your home, not only the living room but for every room. This service is free and a telephone call will bring one of our Engineers at your convenience.



VIRGINIA *Electric* AND POWER COMPANY

One of the First Utility Advertisements to Appear Featuring the Better Housing Program

shower and 20 per cent no private indoor toilet.

Now as a final statistical dose, let's add that Mr. James A. Moffett, Administrator of the Federal Housing Administration, has included in his many pronouncements that there are approximately 16,000,000 buildings needing repair in the U.S.A., and 13,000,000 of them are worth repair and modernizing. It would cost about $1,600,000,000 in hard money to do the job. But when we learn that one-third of the people on the relief rolls are normally employed in the construction industry, we may conclude that a move to repair and modernize is a move in the right direction.

What Is To Be Done About It

Well, it appears that man's castle is certainly in a bad way, but probably not much worse than the owner after the last few gruelling years. He has feared to spend the money even if he had it laid away in forbidden gold and silver in the old stocking. If he did not want to drain the cash surplus, there were only limited credit facilties available for him to obtain borrowed money to do the job. A loan from the bank was for sixty days—perhaps six months—and then possible renewal. The fixed property loss of certain States prevented a property owner from financing under a mortgage certain equipment for modernizing which might be readily detachable. The dilemma of the home owner has made him more humble than Home Sweet Home itself.

It is not surprising that the familiar cry, "There ought to be a law" has been heard, and following it comes "The National Housing Act." Title One of this Act opens up opportunity for banks to make loans for the purpose of financing repairs and alterations with an insurance provision against loss. The Government does not intend to lend money itself, but will stimulate the use of private capital for modernizing and for new construction. The Government will insure loans made by approved discount agencies up to 20 per cent of the total amount invested by the discount agency.

The insurance provided by the Government appears to be ten times the normal debt losses for this class of business according to the experience of leading banking and industry groups that have been selling and financing all kinds of items out of future earnings. Losses on this kind of paper have not exceeded 3 per cent. The Morris Bank, General Motors Acceptance Corporation and such companies record losses under 2 per cent; even an industrial company such as International Harvester that sells to the farmers who have held the headlines for the past few years as the worst sufferers economically of all classes, reports losses on deferred payment paper at under 1 per cent.

The facts are that small loans to those of moderate means have been safer than large loans to big businesses covered by collateral. It appears therefore that the Government insurance of losses up to 20 per cent is tantamount to a guarantee against any loss by the banks. It surely fixes a fairly safe margin in which the banks can carry on loans. Two hundred million insures one billion of potential business. This is additional to cash payments that will be made by the owner above his borrowings. For money loaned under the Federal Housing Administration the owner will pay approximately 9.72 per cent in true interest, but this figure is from one-third to one-half less than existing rates for similar loans by lending agencies.

An Opportunity For The Utility

The executives of our utility companies have been mailed informational literature on the Federal Housing Pro-

gram, and further details are available for the asking. All commercial executives have been sent the Home Owners' Manual which tells the kind of repairs and improvements that can be made and the cost of which may be included in loans insured by Uncle Sam.

An examination of the Home Owners' Manual reveals that the contributions of electric equipment to the improvement and modernization of the home, and for the economic advantage of commercial and industrial properties are fully recognized. Included in the list of equipment, the cost of which may be financed through loans insured under the FHA, are completely modernized kitchens with built-in ranges and refrigerators; non-detachable water heating equipment; combination sinks and electric dishwashers; lighting fixtures, if an integral part of the wiring; air conditioning and ventilating equipment if built in; built-in oil conversion burners.

There is food for thought in this list, for both manufacturer and utility. The hurdle of public acceptance for some of these items has been no tougher for the utility commercial executive than the hurdle of financing. The inclusion of items in the FHA Manual offers the manufacturer, the utility and dealer a new approach to their sales problems. The prospective property owner wishing to improve and modernize his property through the permanent installation of electric (or gas) equipment, and who has no immediate cash reserve, now will be able to get a loan from the bank under specified conditions. It can be from $100 to $2,000. He can pay it back in monthly instalments in one to three year periods. He is going to pay less interest than he would have been required to do before the National Housing Act came into being, under similar loaning conditions. The borrower makes out a Property Owner's Statement and presents it at the bank; his character and employment are to be major considerations in the bank's action for granting the loan.

Field Organization

It is important to bear in mind that the focal point of the Better Housing Program is local industry cooperation. National plans will be carried forward by Regional and State Directors, all appointees of FHA. The State Directors will have permanent office and staff. Ultimately the State Director will appoint Community Directors who will be outstanding men in the City or Town and will organize and lead community campaigns to stimulate action. It is anticipated that the civic spirit will dominate and the commercial advantages to be gained by industry will take second place. More people employed in making better homes will ultimately bring about better business.

Administrator Moffett has been so deeply impressed with the importance of the hearty participation of the building equipment and building service industry, in fact all industry, for the success of the Better Housing Program, that an Industries Division has been set up in Washington with Industry Advisors to serve in the dissemination of information, and for consultation on all problems connected with the Federal Housing movement.

It is recognized that the modernizing job is a big one. Resistance must be broken down on several fronts, none the least of which is the apathy of property owners to act. Large forces of salesmen for industry, well trained and well informed, will be needed to help gain the grand objective of business recovery. Congress supplied the legislation; willing workers supply the information; so success or failure appears to lie in the hands of industry itself.

Suggestions for Utility Participation

The Federal Housing Administration has great potentialities, but probably cannot be expected to achieve the complete solution of inaction in the construction industry.

The Better Housing Program as a whole may be slow in gathering momentum. Many working parts must be synchronized. No one can have any argument with the motive for approved housing and better living. At very least there is an opportunity for the electrical industry to convince the home owner that an investment in electrical improvements is an investment which will endure and will add to convenience and comfort in living.

The writer would offer the following suggestions for tie-in with the Federal Housing program:

1. Commercial Executives should familiarize themselves and their sales people with the Better Housing Program and determine on means to make property owners conscious of improvements to be made, and supply the urge to make electrical improvements now.

2. Arrange that the manufacturers, wholesalers and dealers have knowledge of, and interest in, electrical equipment which can be financed through loans approved under the National Housing Act.

3. Advertise and promote to property owners the advantages of investment in electrical equipment, especially the built-in equipment approved for these insured loans.

4. Help to organize special modernizing exhibits.

5. Be familiar with the Modernizing Credit Plan and urge the local banks to extend borrowing privileges in accordance with the recommendations of FHA.

6. Support the general housing campaigns in your community, for civic betterment, and ultimately for commercial advantages.

7. Electric Leagues might take the lead in promoting home modernizing exhibits.

8. Know the name and address of your State Director and be acquainted with the Community Director. Cooperate with any Community Chairman appointed.

9. Improve your own property. Practise what you preach.

10. Bear in mind that better homes are larger users of electricity. The electric utility will profit in good will, and in more load, to that degree that the Commercial Manager is alert to the opportunity for participation in the National Program.

The utilities should be numbered among the commercial ambassadors of industrial America, and as such they should accept the Federal Housing Program as a challenge, and as an opportunity for profit and service.

Accuracy Record of Meter Readers

Meter readers employed by the Commonwealth Edison Company last year made 12,889,533 meter readings with an accuracy record of 99.986 per cent. A survey just made by the company discloses that five meter readers read approximately 350,000 meters during 1933 without making an error. Three of these have an accuracy record of 100 per cent so far this year, and one of them has not made a mistake in two years.

The accuracy champion of the company's 210 meter readers is John Rice, 2332 Addison street, who has read 142,210 meters since August 1, 1932, without an error. Stanley Mason, 3045 Cornelia street, and Ernest Rodell, 4049 North Francisco avenue, have an unbroken record for accuracy dating from October 1, 1932, to the present time.

Accuracy in meter reading has increased materially during the last few years, the survey shows. In 1923 errors averaged one in 834 readings, or approximately one-tenth of one per cent. In 1929 the average was one in 1,568 readings. Mistakes have been reduced even more rapidly since then, the record for 1933 being an average of one error in 7,382 readings, approximately one one-hundredth of one per cent. At this rate, the average Edison customer would have to use electricity for 615 years before a meter reader made an error in reading his meter.

SERVICE VOLTAGES IN THE UNITED STATES

By G. S. MERRILL
Nela Park Engineering Department, Cleveland, Ohio

A detailed analysis of the information on service voltages contained in the voltage booklets issued by the manufacturers of incandescent lamps (which serve as a guide in the distribution of their product) appeared in the EDISON ELECTRIC INSTITUTE BULLETIN, August, 1933, page 144. A similar analysis, as of July 1, 1934, is given in the accompanying table, based on the latest information then available. The voltage trend has continued upward, as shown by the following summary:

PER CENT OF POPULATION LISTED SERVED AT DIFFERENT VOLTAGES

Voltage	*1923*	*1928*	*1933*	*1934*
110	36.3	15.9	5.2	3.6
115	40.9	61.6	61.7	61.3
120	19.4	22.4	33.0	35.0
All others	3.4	0.1	0.1	0.1
	100.0	100.0	100.0	100.0
Average (1st 3 items only)	114.1	115.3	116.4	116.6

"What a Night" Is Filmed for Use of Utility Companies

The musical comedy puppet show, "What a Night," that is featured as one of the new parts of the electrical exhibit at the 1934 Century of Progress Exposition, has met with such enthusiastic acceptance by the public that it is now being made into a sound motion picture on sixteen millimeter film and will be available for power companies desiring to purchase prints for use in employee meetings, shareholders' meetings, home economics demonstrations, cooking schools, or other types of entertainment that utility companies are called upon to furnish. The film will be offered for sale at $100 per set of two reels. About twenty minutes are required to show the entire two-reel production.

The script emphasizes the economies of domestic electric service, especially house lighting, vacuum cleaner, electric iron, radio, refrigerator, range, and hot water service.

Copies of the script from which the original play was made may be secured from Mr. Jos. W. Hicks, 231 S. LaSalle street, Chicago. Orders for the film may be sent either to the Atlas Educational Film Company, 1111 South Boulevard, Oak Park, Illinois, or direct to Mr. Hicks.

Division and State	Population of Cities and Towns listed in Voltage Book	Ave. Voltage weighted according to population served	Percentage of Population Listed in Voltage Books Served At 110	115	120	125	130	all others*
New England								
Maine	745,300	115.50	7.2	75.6	17.2	..	..	..
New Hampshire	487,200	116.67	1.3	63.9	34.8	..	..	..
Vermont	318,900	115.40	.7	90.9	8.1	.3	..	..
Massachusetts	4,390,900	115.17	5.7	85.3	9.0	..	..	..
Rhode Island	810,200	115.47	1.1	88.4	10.5	..	..	..
Connecticut	1,714,400	115.84	6.8	69.7	23.5	..	..	..
Middle Atlantic								
New York	12,022,800	118.72	2.1	21.4	76.5	..	..	..
New Jersey	3,809,900	119.09	.7	16.7	82.6	..	..	..
Pennsylvania	7,713,900	115.23	.8	93.6	5.6	..	..	..
East North Central								
Ohio	5,272,500	115.86	.6	81.5	17.9	..	..	..
Indiana	1,832,000	115.76	9.2	67.3	22.8	.3	.3	.1H
Illinois	6,371,800	115.03	.7	98.1	1.2	..	..	..
Michigan	3,842,900	117.12	1.5	54.6	43.9	..	..	..
Wisconsin	2,047,300	117.29	3.7	46.7	49.6	..	..	..
West North Central								
Minnesota	1,621,800	116.20	2.1	71.8	26.1	..	..	..
Iowa	1,419,300	114.05	21.4	76.0	2.5	..	..	.1H
Missouri	2,256,700	115.02	1.3	97.0	1.7	..	..	..
North Dakota	260,000	115.54	1.2	86.7	12.1	..	..	..
South Dakota	278,900	114.93	5.5	90.9	3.2	.4	..	..
Nebraska	718,800	115.19	5.0	86.1	8.8	..	..	.1H
Kansas	1,020,300	115.43	2.5	86.4	11.0	..	.4	.04H
South Atlantic								
Delaware	165,800	118.70	3.2	19.7	77.1	..	..	..
Maryland	1,187,000	118.53	2.5	24.4	73.1	..	..	..
District of Columbia	486,900	115.00	...	100.0	...	..	..	..
Virginia	1,140,100	117.30	2.1	49.9	48.0	..	..	..
West Virginia	840,300	115.00	.3	99.3	.4	..	..	..
North Carolina	1,064,900	116.25	4.7	65.6	29.7	..	..	..
South Carolina	532,600	114.97	5.0	90.6	4.4	..	..	..
Georgia	1,146,900	116.06	3.5	78.9	17.6	..	..	..
Florida	946,200	115.05	7.8	83.3	8.9	..	..	..
East South Central								
Kentucky	1,037,400	117.02	7.1	45.0	47.1	..	..	.3L
Tennessee	1,132,900	115.42	3.4	84.8	11.8	..	..	..
Alabama	1,036,600	115.71	2.2	81.3	16.5	..	..	..
Mississippi	554,600	115.64	.9	85.4	13.4	.1	..	.2H
West South Central								
Arkansas	551,400	115.68	3.6	83.0	9.7	3.7	..	..
Louisiana	991,200	117.87	6.1	31.0	62.6	..	3	..
Oklahoma	1,167,500	118.21	2.3	33.1	64.6	..	..	..
Texas	3,035,700	117.60	.9	46.2	52.9	..	..	..
Mountain								
Montana	266,200	116.81	6.0	51.8	41.7	.2	..	.3H
Idaho	216,300	119.43	2.7	6.0	91.3	..	..	..
Wyoming	118,400	115.32	7.0	81.2	10.3	1.5	..	..
Colorado	664,700	116.31	1.5	70.9	27.6	..	..	..
New Mexico	260,800	115.22	2.4	90.0	6.8	..	..	.8H
Arizona	235,300	116.02	11.7	56.1	32.2	..	..	..
Utah	408,700	119.06	1.8	8.8	89.1	..	.3	..
Nevada	65,300	113.89	22.2	77.8	...	..	..	..
Pacific								
Washington	1,166,500	119.75	.3	4.3	95.3	..	..	.1H
Oregon	632,800	119.68	.4	5.6	94.0	..	..	..
California	4,834,600	116.36	17.5	37.9	44.5	..	.1	..
U. S. Total and Averages	84,843,400	116.58	3.63	61.25	35.04	.04	.02	.02

*H—above 130. L—below 110. Not included in average voltage.

ENLIVENING AND HUMANIZING ELECTRICAL ADVERTISING

"I am convinced that we, as an industry, must discard our preconceived notions of utility advertising. . . . We can humanize the service which we have to sell. . . . Some device is necessary to translate electric service from the indefinite and almost indefinable thing that it is to a human, appealing individual—electrical service." — GEORGE E. WHITWELL, *vice-president, Philadelphia Electric Company.*

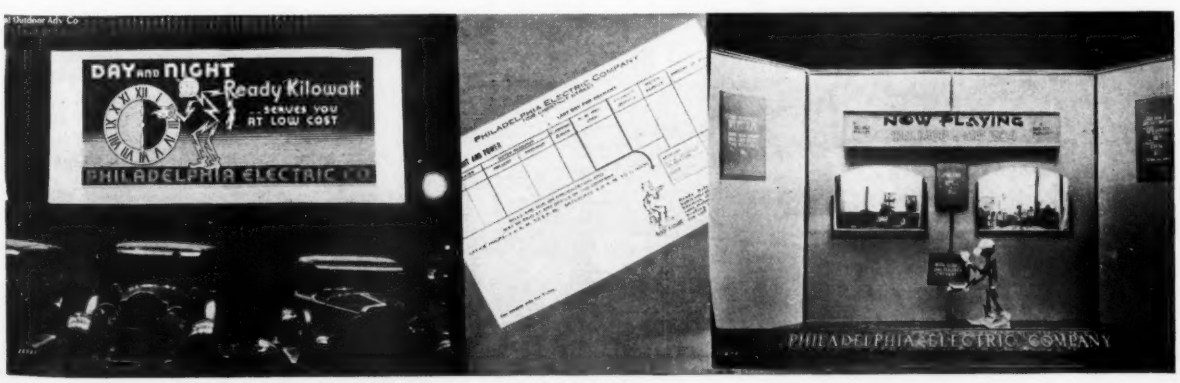
Within recent months a number of companies have adopted a new character in their advertising of electrical service. By name, "Reddy Kilowatt*," the Electrical Servant," he has made rapid strides since his initial bow to the general public in Philadelphia. He now enlivens advertising in newspapers from Philadelphia across the entire central portion of Pennsylvania, parts of Maryland, then over to Ohio, down into the heart of Tennessee through practically all of Alabama, and then across to South Carolina. His novel program has been adopted by a number of leading utilities, including the Philadelphia Electric Company, Pennsylvania Power and Light Company, Ohio Edison Company, Tennessee Electric Power Company, Alabama Power Company and South Carolina Power Company.

The Reddy Kilowatt program, primarily an advertising one, is designed to humanize the utility approach to the public by translating, through a distinctive and appealing character, the complicated business of serving electricity to all types of customers.

The Reddy Kilowatt idea which was originated and copyrighted by Ashton B. Collins of Birmingham, Ala., lends itself to unlimited variation in its application. Its possibilities are indicated by Miss Clara H. Zillessen, advertising manager of the Philadelphia Electric Company, who advises, "The best thing for a company to do is to take the Reddy Kilowatt idea and fit it in with their own company plans and policies."

Philadelphia Electric Company's

* Some companies spell Reddy Kilowatt's name "R-e-a-d-y" whereas others use "R-e-d-d-y". The "Ready" companies indicate a more conservative approach, with the thought that "ready" is a constant reminder to the customer of the *readiness* of electricity at all times, whereas on the other hand those who use "reddy" think this nick-name more quickly ingratiates itself with the public and serves as the personal name of the character, while still indicating "readiness to serve."



I'VE LOOKED IT OVER INSIDE AND OUT... AND IT'S A BARGAIN.
READY KILOWATT
Your Electrical Servant, Says:
HOWDY FRIENDS
Introducing READY KILOWATT Your Electrical Servant
READY KILOWATT SAYS
60 WATTS
What A Difference
Just A Few Years Have Made In the Cost of Electricity In
"READY KILOWATT" Your electric INDOOR ALABAMA from the greatest load THE COMFORT ZONE
Alabama Power News
Alabama Homes Use More Power For Less Money
LOOK WHAT'S BREAKING IN TO OUR ADVERTISE
Range-Water
What is AIR CONDITIONING?
ALABAMA POWER COMPANY

LOOK . . . what's breaking into our ADVERTISING
It's Buddy Edwatt of course . . . that agile, versatile Electrical Servant of yours. He's going to tell you . . . through our ads . . . of his many accomplishments
He is fast, certain, accurate, dependable . . . and you may call upon him at any time. For he knows no hours . . . never sleeps, never loafs. Day or night he's ready to serve you on less than a moment's notice.
You'll enjoy Buddy Edwatt. He'll be your most valuable servant . . . and his pay is only a few cents a day. Welcome him not only as a super-servant, but as a constant, faithful friend.
THE TENNESSEE ELECTRIC POWER CO.
READY KILOWATT
Your Electrical Servant
We'll Pay $2 Each for ALL RHYMES about READY KILOWATT
RULES
THE TENNESSEE ELECTRIC POWER CO.
Around the Clock with READY KILOWATT
THE TENNESSEE ELECTRIC POWER CO.
Today's Winning Reddy Kilowatt Rhyme
THE TENNESSEE ELECTRIC POWER CO.

treatment of the character in its advertising is subtle and distinctive, as is indicated by the series of advertisements reproduced herewith. An advertising authority has written, "Philadelphia Electric Company have taken a new lease on load building since the birth of their Reddy Kilowatt. As in the case with most cartoon characters, his spry antics flag attention. And another considerable point is the fact that he provides a new informal medium to talk through, or about. . . .

"Philadelphia first signed on Reddy Kilowatt as a load builder to stimulate new interest, but he's developing into something of an ad trademark since recent assignments to appliance duty. Again, he supplies fresh spice. Also in his favor is that he can be used midget size, whereas a life-size model putting the finger on special features might overshadow the merchandise.

"The unadorned selling points of any appliance usually make dry reading. But such is not the case when whimsical Reddy Kilowatt is on the spot to supply the novelty every newspaper reader craves."

Pennsylvania Power and Light Company is applying the program to comparatively small communities scattered over a tremendous area throughout central Pennsylvania. Apparently giving it an entirely different approach from that used in Philadelphia, this company started out with teaser ads, then followed with black and white ads that would stand out in any newspaper, especially in small communities where the printing of the paper might not lend itself to ads with much art work.

In the application of the character to the monthly service bill, the Pennsylvania Power and Light Company use an unusually large figure of Reddy Kilowatt on the bill without detracting from the function of the bill. Sales Manager Merrill C. Morrow and Advertising Manager R. W. Hoy are not only featuring Reddy Kilowatt conspicuously in all advertising, but in employee meetings and appliance displays, windows, etc.

The Tennessee Electric Power Company, with its customers scattered over most of middle Tennessee and including the metropolitan cities of Chattanooga and Nashville, is making effective use of the program. Mr John C. Costello, advertising manager, when questioned as to Reddy Kilowatt, replied, "There is a peculiar quality of good will resulting from the personality of Reddy Kilowatt. It is impossible for any one to mention his name without doing so in a friendly manner. Presenting him as we have from day to day, as in our recent rhyme contest, it is bound to create a desire for some of the various services advertised on the part of those who do not already enjoy such services."

Tennessee Electric Power followed its introductory ads with a rhyme contest, giving the public sample advertising of Reddy Kilowatt and rhymes, and inviting the public to submit rhymes and agreeing to publish one each day and pay the daily winner $2 for his or her rhyme. The success of this contest was marked from the outset, and while it was run over a period of only six or

Reddy Is About Ready to Break Out!
A New Guy - Little Reddy -
Want to Hire A Good Servant.
SPEAKING OF BLESSED EVENTS
SPEAKING OF Blessed EVENTS
OHIO EDISON COMPANY
I am
Reddy KILOWATT
There are millions, yes, billions of me. I am your greatest, yet lowest-paid servant! . . . I BRING YOU FREEDOM
Meet
● Reddy KILOWATT you will like him — he is a genius of accomplishment — capable, infinitely willing, infinitely powerful.
● Reddy KILOWATT gets things done — in the home, in the office, in the hospital operating room — in industry and transportation — kitchen and living room — anywhere — everywhere.
● Reddy KILOWATT wants but little. He is at home any place — toiling the same in cottage or mansion — modest — working for a low wage. Sleep is a stranger to him — clock and calendar alike are meaningless.
● Reddy KILOWATT is YOUR servant, censored, proved — established. Welcome him as a constant friend — for none will serve you more faithfully!
Born a little more than 51 years ago, this Electrical Servant has never tired. He has been a willing, industrious, ageless member of the Work family since birth. He is just as spry and youthful as when he first arrived. The years have imported a greater proficiency, a greater sureness and a greater strength to his eyes and muscles. He's a better worker with each passing day.
Are YOU using Reddy Kilowatt as you should — do you make the greatest use of him? Are you letting him do your hundreds of specific tasks — lighting, cooking, washing, ironing, cleaning, protecting your food and many, many other duties.
Begin today — make full use of him — the more he works the less he costs per hour.
OHIO EDISON COMPANY
MOST Homes HAVE INSUFFICIENT Light!
WHEN YOU BUY
Reddy Kilowatt
Lighten your eye work
Indirect LAMPS as $10.95 and Up
OHIO EDISON

seven weeks, rhymes were submitted throughout the entire property of several hundred towns. In Chattanooga district alone, rhymes were recived from some 1500 contestants, and Nashville district went even stronger with over 2400, many contestants submitting several rhymes.

Mr Costello and his associates were so pleased with the interest of the public that they acknowledged all rhymes with an attractive card, giving to each contestant (whether or not they won) a lamp bulb with the compliments of Reddy Kilowatt. The little card, printed in red, contained the following verse:

"Thank you for the time you spent
And for the dandy rhyme you sent.
In turn I send this gift of light
So I'll be with you day and night.
Always your friend,
REDDY KILOWATT."

Many of the rhymes and illustrations were distinct hits and during the course of the contest a number of appliances and their uses were naturally featured. The Tennessee company also made effective use of Reddy Kilowatt in billboards, car cards, truck banners and neon signs.

After launching Reddy Kilowatt, the Ohio Edison Company began using him in appliance advertising, also featuring him on lighting, apparently taking advantage of the "Better Light—Better Sight" idea. According to Mr Atchley, advertising manager, "Reddy Kilowatt appears to be attracting considerable attention in our territory. . . . I feel that the figure has put a kick into our advertising and that the reaction has been good."

The Alabama Power Company has been featuring the Reddy Kilowatt symbol or idea in practically all of its advertising, and making particularly good use of the figure in "bull's-eye" form. In commenting upon Reddy Kilowatt, Mr W. M. Stanley, vice-president of the Alabama Power Company, said, "In our opinion, Reddy Kilowatt gives a very human translation to the public of the necessarily complicated thing we call 'Electric Service.' If this character did nothing else but convey the servant idea to the customer, it is valuable for that reason alone. I think one of the outstanding features is the application to the monthly service bill, converting the technical 'kwhr' into 'Reddy Kilowatt Servant Hours.'"

The treatment of the Alabama company's monthly service bill is unique, especially as the arrangement for the printing on the bill seemed complicated and yet by a slight shifting Reddy Kilowatt and his message were conspicuously added to the bill. Mr Stanley advises it is their purpose on future bills to show Reddy Kilowatt and his message in colors, varying from month to month. Manager of Sales, Mr J. S. Sutherland, is planning several unique applications of Reddy Kilowatt in his sales program and is starting out by placing figures of Reddy Kilowatt on the company's demonstration trucks, particularly the all-electric kitchen demonstration trucks.

ELECTRIC REFRIGERATOR SALES

HOUSEHOLD MODELS ONLY—SEVEN MONTHS 1934

	YEAR'S QUOTA	SEVEN MONTHS' QUOTA 74%	ESTIMATED TOTAL SALES	% QUOTA REALIZATION
New England Division				
Connecticut	19,243	14,240	15,215	106.8
Maine	7,899	5,845	5,805	99.3
Massachusetts	49,224	36,426	42,279	116.1
New Hampshire	5,095	3,770	3,864	102.5
Rhode Island	8,074	5,975	6,509	108.9
Vermont	3,305	2,446	2,257	92.3
Eastern Division				
Delaware	2,054	1,520	2,606	171.4
Maryland & D. C.	20,319	15,036	32,308	214.9
New Jersey	49,202	36,409	48,193	132.4
New York	154,788	114,543	145,358	126.9
Pennsylvania	86,678	64,142	104,656	163.2
East Central Division				
Kentucky	11,293	8,357	17,331	207.4
Ohio	64,710	47,885	77,897	162.7
West Virginia	7,970	5,898	16,477	279.4
Middle West Division				
Iowa	19,012	14,069	18,391	130.7
Kansas	14,127	10,454	18,404	176.1
Missouri	27,824	20,590	45,725	222.1
Nebraska	9,783	7,239	13,220	182.6
Pacific Coast Division				
Arizona	2,916	2,158	3,070	142.3
California	78,695	58,234	52,671	90.4
Nevada	714	528	1,033	195.6
North West Division				
Idaho	3,303	2,444	3,851	157.6
Montana	3,550	2,627	4,622	175.9
Oregon	10,010	7,407	13,954	188.4
Utah	4,863	3,599	5,323	147.9
Washington	18,025	13,339	16,500	123.7
South Eastern Division				
Alabama	7,187	5,318	13,635	256.4
Florida	9,790	7,245	10,303	142.2
Georgia	8,309	6,149	23,769	386.6
North Carolina	10,945	8,099	18,752	231.5
South Carolina	4,358	3,225	8,612	267.0
Tennessee	9,783	7,239	23,538	325.2
Virginia	11,031	8,163	19,160	234.7
Great Lakes Division				
Illinois	77,150	57,091	81,088	142.0
Indiana	28,271	20,921	29,691	141.9
Michigan	44,387	32,846	44,219	134.6
Wisconsin	26,180	19,373	18,510	95.5
North Central Division				
Minnesota	19,794	14,648	15,209	103.8
North Dakota	2,511	1,858	2,816	151.6
South Dakota	3,217	2,381	3,719	156.2
Rocky Mountain Division				
Colorado	8,420	6,231	9,278	148.9
New Mexico	1,388	1,027	2,227	216.8
Wyoming	1,311	970	1,994	205.6
Southwestern Division				
Arkansas	4,554	3,370	7,781	230.9
Louisiana	8,242	6,099	8,260	135.4
Mississippi	3,568	2,640	4,203	159.2
Oklahoma	10,531	7,793	16,087	206.4
Texas	26,903	19,908	44,050	221.3
Total	1,010,506	747,774	1,124,420	150.4

PERSONNEL OF E.E.I. COMMITTEES FOR 1934-1935

Appointments to Edison Electric Institute Committees for service in 1934-1935 have been practically completed except for the Accounting and Sales Committees, and these will be made very shortly. Committee work is definitely under way for the present administrative year. Meetings of the several engineering committees have been called for October as noted elsewhere in this issue.

The acceptances to membership on the E.E.I. Committees received up to September 10th follow:

ACCIDENT PREVENTION COMMITTEE

W. A. Buchanan, *Chairman;* Appalachian Electric Power Co., Welch, W. Va.
C. R. Beardsley, Brooklyn Edison Co., Inc., Brooklyn, N. Y.
H. J. Burton, Consumers Power Co., Jackson, Mich.
E. W. Gorry, The United Electric Light & Power Co., New York, N. Y.
E. R. Kropp, Union Electric Light & Power Co., St. Louis, Mo.
Wills Maclachlan, 12 Bloor Street East, Toronto, Can.
J. P. McCann, New England Power Engineering & Service Corp., Worcester, Mass.
C. N. Rakestraw, The Cleveland Electric Illuminating Co., Cleveland, Ohio.
C. J Rutland, Texas Power & Light Co., Dallas, Texas.
W. R. Smith, United Engineers & Constructors, Inc., Newark, N. J.

ELECTRICAL EQUIPMENT COMMITTEE

W. F. Sims, *Chairman;* Commonwealth Edison Co., Chicago, Ill.
P. P. Ashworth, Utah Power & Light Co., Salt Lake City, Utah.
A. E. Bettis, Kansas City Power & Light Co., Kansas City, Mo.
R. N. Conwell, Public Service Electric & Gas Co., Newark, N. J.
M. T. Crawford, Puget Sound Power & Light Co., Seattle, Wash.
S. M Dean, The Detroit Edison Co., Detroit, Mich.
E. W. Dillard, New England Power Engineering & Service Corp., Boston, Mass.
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J. F. Fairman, Brooklyn Edison Co., Inc., Brooklyn, N. Y.
E. S. Fields, The Union Gas & Electric Co., Cincinnati, Ohio.
J. H. Foote, The Commonwealth & Southern Corp., Jackson, Mich.
H. S. Fitch, West Penn Power Co., Pittsburgh, Pa.
E. S Fitz, Virginia Electric & Power Co., Richmond, Va.
E. E. George, The Tennessee Electric Power Co., Chattanooga, Tenn.
W. E. Gundlach, The Milwaukee Electric Railway & Light Co., Milwaukee, Wis.
R. A. Hentz, Philadelphia Electric Co., Philadelphia, Pa.
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S. J. Lisberger, Pacific Gas and Electric Co., San Francisco, Calif.
J. E. Sheehan, Houston Lighting & Power Co., Houston, Texas.
William Shuler, The Dayton Power & Light Co., Dayton, Ohio.
A. E. Silver, Electric Bond & Share Co., New York, N. Y.
L. M. Smith, Alabama Power Co., Birmingham, Ala.
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Stanley Stokes, Union Electric Light & Power Co., St. Louis, Mo.
George Sutherland, New York & Queens Electric Light & Power Co., Flushing, N. Y.
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T. A. PURTON, Idaho Power Co., Boise, Idaho.

A. F. RANDOLPH, United Engineers & Constructors, Inc., Newark, N. J.

D. W. ROPER, Commonwealth Edison Co., Chicago, Ill.

J. J. SCHOLZ, The Commonwealth & Southern Corp., Birmingham, Ala.

H. R. SEARING, The New York Edison Co., New York, N. Y.

H. P. SEDWICK, Public Service Co. of Northern Illinois, Chicago, Ill.

H. P. SEELYE, The Detroit Edison Co., Detroit, Mich.

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STANLEY STOKES, Union Electric Light & Power Co., St. Louis, Mo.

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G. S. VAN ANTWERP, Philadelphia Electric Co., Philadelphia, Pa.

C. V. WADDINGTON, Kansas Gas & Electric Co., Wichita, Kan.

J. S. WARE, Public Service Electric & Gas Co., Newark, N. J.

J. W. YOUNG, New England Power Assn., Boston, Mass.

USE OF COPPER OXIDE VARISTORS IN REDUCING ACOUSTIC SHOCK*

This report describes the latest form of copper-oxide device, designed for use in operators' telephone sets in reducing acoustic shock and summarizes briefly the development work done on it.

The non-linear characteristics of copper-oxide elements and their use in rectifiers were described by Grondahl and Geiger [1] in 1927. It became evident that by using two elements in parallel, oppositely poled, a device could be obtained which was of low resistance for the higher voltages and of high resistance for the lower voltages.

Trials were made of a number of combinations of 1½-inch copper-oxide discs and two combinations were found which had practically the same effectiveness as the 1-A Acoustic Shock Reducer[2]. Smaller discs, ¾-inch in diameter, became available and tests made with them indicated that they were more suitable for this kind of application. A number of units were obtained for laboratory study and for an experimental field trial. The later laboratory work and the field trial results indicated the need for a moisture-proofing treatment and a few other minor changes. The units, in their present form, include these modifications and are referred to as varistors.[3]

Complete data have not yet been obtained as to the stability of the units and their service life due to the limited experience to date. They appear, however, to be reasonably stable and to have a reasonable length of life, and as time goes on, further information on these points will be obtained.

Description

One form of the varistor consists of six copper washers (¾-inch in diameter) which have been treated so as to produce a layer of cuprous oxide on one side and which are assembled on a bolt, similar to a copper-oxide rectifier unit. The assembly is connected electrically so that when a voltage of one polarity is impressed across the terminals, current will flow through three of the washers in the conducting direction, while with opposite polarity, current will flow through the other three washers.

This varistor, which has no cover, is equipped with a bracket and is intended to be mounted on a flat surface. Another type varistor is a similar unit enclosed in a small metal can, and is intended for relay rack mounting. The two varistors and a schematic circuit diagram are shown in Fig. 1.

In using either type of varistor, it is connected across the receiver terminals of the operator's telephone set as shown in Fig. 2.

When the varistor has applied to it the relatively low voltages due to speech, its impedance is relatively high (about 2500 ohms at 0.1 volt) and it shunts from the receiver only a small amount of current. (See Fig. 3.) When relatively high voltages are impressed on the operator's telephone circuit, the impedance of the varistor drops to a low value (about 15 ohms at 1.5 volts) and causes most of the current to be shunted from the receiver, thereby greatly reducing the intensity of the acoustic disturbance.

With this device, the intensity of an acoustic disturbance having an original value about 48 db above an arbitrary reference level is reduced to approximately 15 db above this level. As previously mentioned this reduction is practically the same as that afforded by the 1-A Acoustic Shock Reducer.

There is a volume loss of transmission caused by the insertion of the varistor in the operator's telephone circuit which under ordinary circumstances is somewhat less than 1 db. However, since the device limits the peak intensity of sound in the receiver, there is no net effective transmission loss.

Laboratory Tests

Laboratory tests were made to determine the effects of heat and humidity on

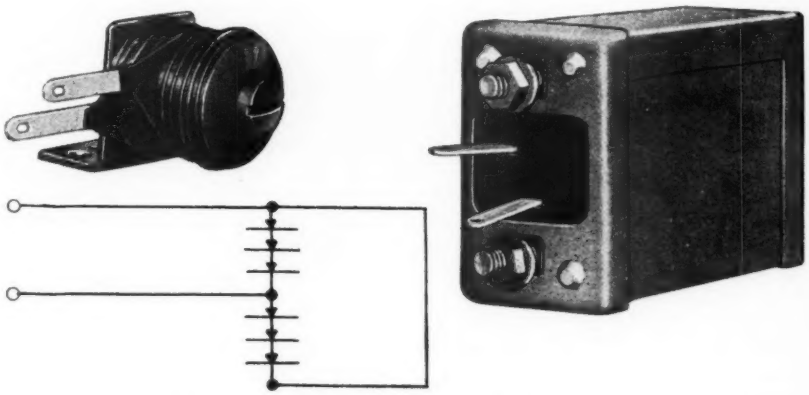

Fig. 1—Upper left, varistor for flat mounting. Right, varistor for rack mounting. Lower left, schematic diagram

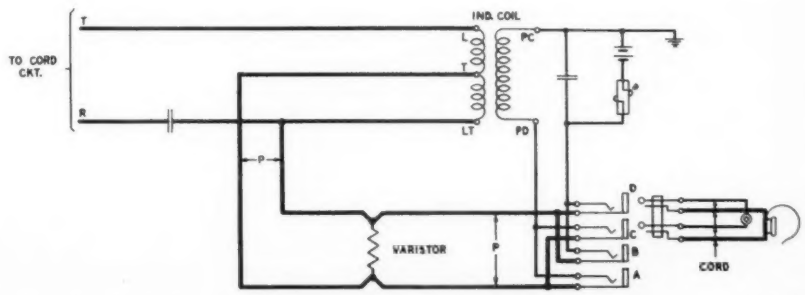

Fig. 2—Typical operator's telephone circuit showing method of connecting varistor across the receiver

* This article is based on a report of the Joint Subcommittee on Development and Research of the E.E.I. and the Bell System, which has been recommended as an Engineering report.

(1) "A New Electronic Rectifier," Trans. A.I.E.E., vol. 46, page 357, February, 1927. See also L. O. Grondahl, "Copper-Cuprous-Oxide Rectifier and Photoelectric Cell," Rev. Modern Physics, vol. 5, page 141, April, 1933.

(2) This is a step-up transformer and discharge gap device. See Conwell and Warren, "Status of Joint Development and Research on Low Frequency Induction," B.S.T.J., vol. 10, pages 221-222, April, 1931. Also Trans. A.I.E.E., vol. 50, page 465, June, 1931.

(3) The word "varistor" is used to denote a device made of a material having a non-linear voltage-resistance characteristic.

the units in their original form before the moisture-proofing varnish was specified. These tests indicated that humidity seriously impaired the shock reduction efficacy and, accordingly, additional tests were made with several different moisture-proofing treatments.

Measurements were made of the resistance in the two directions at 0.1 volt, d-c., and at 1.5 volts, d-c., and of the 1000-cycle transmission loss at 0.1 volt. The results of the first two measurements are indices of the transmission loss and acoustic shock reduction, respectively. An increase in the resistance at 0.1 volt indicates a decrease in the transmission loss at ordinary speech levels and an increase in resistance at 1.5 volts, a decrease in effectiveness of shock reduction. Data were obtained by exposing the units to a 90 per cent relative humidity at 85°F. for a period of 12 days. The transmission loss increased from 0.3 db under room conditions to about 0.4 db in humidity and fell to about 0.2 db after removal. The resistance at 0.1 volt, d-c., decreased from 3100 ohms under room conditions to about 2500 ohms in humidity and increased to 4100 ohms four hours after removal. The 1.5-volt resistance shows a rise from 10 ohms in room conditions to 45 ohms shortly after removal from humidity. At this voltage the resistance rises rapidly while in humidity and overcomes the tendency toward reduced resistance due to the increase in temperature. After the four-day recovery period the units were found to be about 15 db poorer in shock reduction than before exposure to humidity.

The measurements showed that the transmission loss increased from 0.4 db at 75°F. to about 2.2 db at 120° F. After one hour of recovery at 67°F., the transmission loss dropped to 0.55 db. A second exposure to 120°F. increased the loss to about 2 db, and removal to room temperature decreased it to about 0.7 db. The resistance at 1.5 volts varied little during the tests, having a maximum value of 13 ohms under room conditions and a minimum of 6 ohms at 120°F. This indicated little change in effectiveness of shock reduction. The resistance at 0.1 volt dropped from an initial value of 3200 ohms at 75°F. to a minimum of 500 ohms at 120°F.

Measurements were made on seven groups of five units each to determine the effects of different moisture-proofing treatments in preventing the rise in resistance due to humidity. The units potted in Compound No. 1 and those coated with varnish appeared to be well protected, showing an increase of only

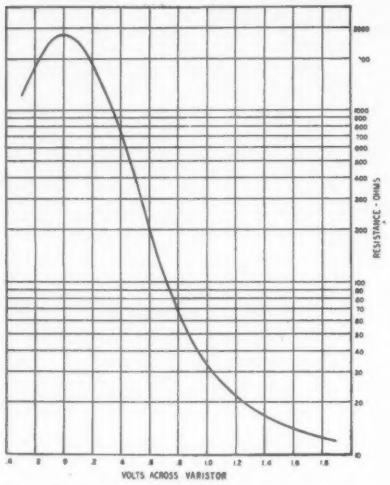

Fig. 3—D.C. resistance of varistor—temperature 80° F.

4 ohms after 43 days in humidity. The resistance of the untreated units increased about 30 ohms in the same period. Observations indicated that the units dipped in Compound No. 3 were fairly stable while the resistance of the potted units increased to 65 ohms after potting and to 140 ohms in humidity. All groups were satisfactory from a transmission standpoint, the average volume loss at 0.1 volt and 1000 cycles being about 0.2 db.

Summary of Results of Laboratory Tests

The results of the laboratory tests are summarized as follows:

At ordinary room temperatures and low relative humidities the varistors provided reduction of acoustic shock comparable with that afforded by the 1-A Acoustic Shock Reducer and caused a volume transmission loss of about 0.5 db at 1000 cycles. At higher temperatures the transmission loss increased to 1.0 db at 100°F. and 2.2 db at 120°F. The acoustic shock reduction was not appreciably changed. Upon cooling, the transmission loss fell to practically its original value and successive prolonged exposures to higher temperatures had only a slight cumulative effect.

A gradual aging, which slightly increased the transmission loss and slightly impaired the acoustic shock reduction, was noted over a period of 4½ months at temperatures of 66° to 80°F. with low relative humidity.

Under conditions of high relative humidity the acoustic shock reducing ability of the varistors were seriously impaired. This was overcome, to a great extent, by coating them with varnish.

Eighty varistors (not moisture-proofed) were placed on field trial in various central offices. Measurements were made at intervals of their resistances, in the two directions at approximately 1.5 volts, d-c., using a special test set. This test set was designed primarily for determining whether or not the resistance is above or below a value of 20 ohms at 1.5 volts, but in these tests its usage was extended to obtain the value of resistance at approximately 1.5 volts. The values are increasing and those for an office subject to high humidity are higher than those under more usual conditions. Some of the increase is probably due to aging, but in view of the laboratory tests a considerable amount of the increase is attributed to the effect of humidity.

None of the units has failed during the period of the field trial. There are indications that in several of the units single washers have become short-circuited, but there were no reports of trouble. This short-circuiting increases the transmission loss slightly and also increases the effectiveness of acoustic shock reduction. A few of the units were replaced because of increased resistance at 1.5 volts but none has reached a state of seriously impaired effectiveness.

THE COVER

The very dramatic illustration on the cover of this issue was originally used by the Duquesne Light Company of Pittsburgh in a five-column advertisement in its local newspapers. The text of the advertisement read:

Excitement DURING THE STORM

A storm comes unannounced. One of those blinding, raging, two-fisted, he-man storms damaging anything and everything in its path. A storm that has little respect for the precious lines that bring Electric Service from the Power Plants to homes and industry.

Yes, when a storm breaks, there's excitement . . . excitement a plenty for an army of 500 men out there repairing lines that are down, replacing poles that are broken, transformers that are crippled; facing all manner of danger and doing everything that's humanly possible in order that Electric Service may come through.

More and more every year the percentage of interruptions to Electric Service is growing less and less. Not because storms are becoming fewer or less damaging but rather because men and equipment are more capable in combatting them. The same type of storm that ten years ago might have caused serious and prolonged interruption to service, is now outwitted and outmaneuvered by highly trained men systematically dispatched at the first sign of unfavorable weather; by heavier lines; by specially constructed towers and poles; by duplicate and triplicate lines wherever possible . . . and with the result that throughout the past two years Electric Service has been constant and uninterrupted 99.9927% of the time.

RUNNING WATER CAMPAIGN DISCUSSED AT CONVENTIONS

The Electric Water Systems Council's campaign to stimulate the sale of electric pumping equipment to rural customers has received much attention on the part of the utility companies, both individually and at their various regional group meetings. These discussions have been on methods of determining prospects, follow-up system and dealer cooperation.

Mr. G. E. Lewis, Managing Director of the Rocky Mountain Electrical Association, states that they will feature this activity in their program and discussion at their convention. Mr. Lewis writes:

"The Public Service Company of Colorado, Denver, has just completed a survey of its fringe territory, during which it contacted one thousand customers, one hundred fifty-eight of which were without running water. Its contemplated survey will cover six thousand more customers from which the ratio of non-running water customers which prevailed with the first one thousand, is expected to obtain.

"Naturally, the company is much encouraged over the prospects. To promote the possibilities in this direction, this Association, next week, is calling a meeting of all the pump interests located in Denver, to whom we will give the story of the possibility of this activity from their standpoint.

"At our convention, we will explain to all utility managers and commercial men the results of the Public Service Company's survey with the hope that we will enlist the interest and cooperation of virtually all the leading companies in Colorado, New Mexico and Wyoming."

Exhibit at State Fair

Through the cooperation of the Iowa State College and *Successful Farming* an exhibit was prepared for the Iowa State Fair featuring running water on the farm, stressing the many uses and advantages of this much needed farm home improvement. This exhibit attracted considerable attention.

Promotional Material

Over 150,000 broadsides, 40,000 plan books and 5,000 window seals have been furnished by the Council to utility companies and manufacturers for distribution. The broadside is intended to be the first mailing piece to the prospect, and any display of interest on his part will be followed up by personal calls by the dealers' representatives.

Orders are continuing to come in for this material and as suggested in the plan book, the first thing for the utility company with rural customers to do is to check their list to determine how many do not have running water and then see that each of those prospects receives a copy of the broadside.

The possibilities in this market are surprising and deserve the careful consideration of utility executives.

Opportunity For Financing

Included in equipment on which insured loans may be made under Federal Housing Administration are Water Systems, covering pumping equipments, tanks and all necessary plumbing in connection with installation. Also the cost of drilling the wells may be added. This will help to overcome a major handicap in closing sales.

E.E.I. COMMITTEE MEETINGS SCHEDULED FOR OCTOBER

Plans are being made to hold the Fall meeting of the Transmission and Distribution Committee at the Edgewater Beach Hotel in Chicago on Oct. 22, 23 and 24. The Insulated Power Cable Engineering Association and the High Tension Cable Committee of the A.E.I.C. plan to hold meetings on Oct. 23 and 24 at the same place and joint sessions will be held with both of these groups and the Transmission and Distribution Committee on the afternoon of Oct. 23 and the forenoon of October 24. The Electrical Insulation Committee of the National Research Council is planning a meeting on Oct. 24 which will be continued at the Electrical Engineering Laboratories of the University of Illinois at Urbana on Oct. 25, 26 and 27. This will permit a joint session with the Transmission and Distribution Committee, the High Tension Cable Committee of the A.E.I.C. and the Insulated Power Cable Engineering Association on the forenoon of Oct. 24.

The program for the Transmission and Distribution Committee has not been completed, although arrangements have been made for a demonstration of lamp flicker at five o'clock in the afternoon of Oct. 22, and a Round Table Discussion on underground subjects during the morning session on Oct. 23. This Round Table Discussion will be in charge of Mr. C. T. Sinclair, former Chairman of the Undedground Systems Committee.

A meeting of the Electrical Equipment Committee of the E.E.I. has been arranged for Oct. 25 and 26 at the Edgewater Beach Hotel.

The Prime Movers Committee is planning meetings on October 22 and 23, while the Hydraulic Power Committee and Accident Prevention Committee are considering meetings that week.

The selection of Chicago for the meetings of these E.E.I. committees was decided upon to permit a joint session with the other groups mentioned above and to permit taking advantage of reduced railroad fares that may be obtained on account of the Chicago Fair.

It is hoped that further details concerning these meetings can be given in the October issue.

"SLIM"

A Story of Transmission Lines and the Men Who Build Them

Slim—Little, Brown and Company, Boston, $2.50

The last prairie schooner has vanished into the setting sun. Sweating, grizzled men no longer swing their spike mauls "laying steel" across the continent, and the echoes of Paul Bunyan's ax died out in the lumber camps a generation ago.

But Romance is not so much a date in history as a period in every individual's life, and here is a story of the New Adventure—a story of spidery steel towers and how they grow; of singing transmission lines and the men who string them; of completed catenary systems and the bronzed crews who hammer the copper rivets into place.

The title of the book is "Slim." Its author, William Wister Haines, is only 25 years old, but for seven years he worked with construction crews in various parts of the country.

"Slim" Kincaid, a southern "cracker," gets a job as a "grunt" when a gang is erecting steel on the edge of his uncle's cornfield. To him the linemen are demigods and he toils and endures that he may

(Continued on page 319)

BETTER LIGHT—BETTER SIGHT PROGRAM

Universal Interest in Lighting Program

Unquestionably this fall and winter will see the greatest drive on lighting in the history of the electrical business. The Better Light, Better Sight Bureau reports news of lighting programs from every section of the country—from the smallest of individual utilities to the great metropolitan centers.

One incandescent lamp manufacturer with representatives practically blanketing the country states that results from a recent survey shows but two electric utilities not planning local lighting activities as against the balance of many hundreds of utilities that are organizing aggressive Better Light, Better Sight programs.

Prospects for success are assured because of the general thoroughness and comprehensiveness of the plans. Selling "better seeing" is the keynote of every program. Promoting the interest and participation of all groups connected with eyesight conservation has broadened the proposed activities in dozens and dozens of cities.

Special sales training of utility employees and sales forces on the new approach and science of seeing is now under way and widely planned. Sales forces of other allied interests such as department stores are part of the sales training programs in the great majority of situations.

Added man and woman power in the lighting departments of a large number of utilities has been evident for several months and indications are that many will be tripled and quadrupled by October and November.

Better Light for Better Sight has taken hold. Public receptiveness and acceptance of "better seeing" conditions has already been definitely demonstrated.

It is confidently predicted by those heading up the National Sight Program that if the local plans, now known to be under way and being considered are carried through, the National Better Light, Better Sight activity is assured of a complete success.—*G. R. T.*

LIVE AND LET LIVE

By M. E. SKINNER

Chairman, National Better Light—Better Sight Bureau

One phase of the activity being sponsored by the National Better Light, Better Sight Bureau impresses me as needing especial emphasis to utility executives. There is a chance that we may be victims of our own enthusiasm for the new specification lamp merchandise being sponsored by the bureau, and I believe a word of caution would be timely.

When the utility group first approached the portable lamp manufacturers with the suggestion that specifications be drawn to define the lighting effectiveness of reading lamps, the manufacturers were most insistent that the specifications should include requirements to assure the quality of materials and workmanship. The manufacturers were primarily interested in combatting "chiseling" within their own ranks; but the argument was forcefully advanced that if a utility company were going to put the stamp of its approval on a piece of merchandise, the quality of that merchandise must be above reproach. The utility representatives agreeing fully with this point of view were nevertheless insistent that the specifications should not include any requirements which would force the manufacturers to use more expensive materials or finishes where cheaper ones would do. I recall Mr J. F. O'Brien's compelling statement to the effect that poor people's eyes needed protection just as much as those of their more fortunate and wealthy neighbors. "For this reason," he argued, "the quality requirements of the specifications should be so drawn as to permit manufacturers full latitude in the styling and finish of the lamps so that models could be offered to suit every pocketbook."

The National Better Light, Better Sight Bureau is interested in improving the opportunities for securing better light as a way to better sight. They heartily endorse the effectiveness requirements of the Illuminating Engineering Society specifications for study, reading and other "working" types of portable lamps. They are pleased to see that these specifications contain minimum quality requirements, particularly with respect to the electrical circuit, which should make for long life and satisfac-

(Continued on page 317)

Staff of instructors of the Lighting Sales Institutes of a leading manufacturer who will lecture at upwards of 60 schools that will be conducted throughout the country this fall. The group is shown with the stage setting for the commercial lighting course, one of a number of complete sets to be employed by each corps at the schools throughout the country.

An estimated five thousand engineers, service workers and sales people of utilities and associated local interests will receive comprehensive instruction in the scientific aspects of the new Science of Seeing at these schools, and will learn how to apply this knowledge most effectively in their lighting sales and service work during and following the current Better Light—Better Sight activity.

PAPERS ENTERED IN 1934 PRIZE CONTEST TO BE LOANED

The BULLETIN publishes below and on following pages a list of the papers and exhibits entered in the 1934 Prize Awards competition. With the exception of the prize-winning papers (which, insofar as may be practicable, are to be published in the BULLETIN during the year), and the entries for the Coffin, Hughes and Martin Awards which may be inspected at the general offices, the Institute will be glad to loan to any member company or individual any of the papers listed. Application for loans of papers should be made to the secretary, Edison Electric Institute, 420 Lexington Avenue, New York, N. Y. Requests for loans will be filled in the order of receipt.

PRIZE WINNING PAPERS

H. M. Byllesby Prizes

First—H. A. **Wardenburg**	Commonwealth Edison Co., Chicago, Ill.	"How to Increase the Usefulness of the Accountant in the Electric Light and Power Industry"
Second—A. J. **Kieffer**	Louisville Gas and Electric Co., Louisville, Ky.	"How to Increase the Usefulness of the Accountant in the Public Utility Industry"
Third—Arthur J. **Murphy**	Wisconsin Public Service Corp., Sheboygan, Wis.	"How to Increase the Usefulness of the Accountant in the Public Utility Industry"

B. C. Forbes Prize

Cash Prize—George Anthony Palmer	New England Power Engineering and Service Corp., Boston, Mass.	"Factual Information and Utility Employees"

A. L. Lindemann Prizes

First—Miss Georgianna **Linstid**	Virginia Electric and Power Co., Richmond, Va.	"Advantages of Electric Cookery for Domestic Purposes"
Second—Miss Anne **Glotzbach**	Southern California Edison Co., Ltd., Santa Ana, Cal.	"Advantages of Electric Cookery for Domestic Purposes"
Third—Miss Mayme E. **Miller**	Minnesota Power and Light Co., Duluth, Minn.	"Advantages of Electric Cookery for Domestic Purposes"

James H. McGraw Prizes

First—Frank E. **Sanford**	Union Gas and Electric Co., Cincinnati, Ohio	"Measures of Operation and Maintenance for Overhead Electric Distribution"
Second—James L. **Holton**	New York & Queens Electric Light and Power Co., Flushing, N. Y.	"Engineering Necessary in the Development of an Extensive Low Voltage Network"
Third—S. O. **Schamberger**	New York Power and Light Corp., Albany, N. Y.	"Hydro Station Operation with Minimum Loss"

PAPERS SUBMITTED BY THE FOLLOWING COMPANIES FOR THE COFFIN, HUGHES AND MARTIN AWARDS ARE AVAILABLE FOR INSPECTION AT THE EDISON ELECTRIC INSTITUTE

(This group won prizes or honorable mention)

Charles A. Coffin Award

Gold Medal—The Hartford Electric Light Company, Hartford, Conn.

George A. Hughes Award

Cup—The Idaho Power Company, Boise, Idaho

Cash Award—Mr. L. W. Brainard

Thomas W. Martin Award

Bronze Plaque—Virginia Electric and Power Company, Richmond, Va.

(Other Entries for Coffin and Hughes Awards)

Charles A. Coffin Award

Nantahela Power and Light Co., Bryson City, N. C.

George A. Hughes Award

West Texas Utilities Co., Abilene, Texas

PAPERS WHICH WILL BE LOANED TO MEMBERS

Submitted by	*Employed by*	*Title of Paper*
Adams, B. R. S.	Alabama Power Co., Birmingham, Ala.	"Public Relations in the Electric Light and Power Industry"
Andrews, George E., Jr.	Narragansett Electric Co., Providence, R. I.	"The Application of Thyratron Tubes to the Development of Direct Current Transmission Lines"
Auchmuty, Hazel F. M.	Mississippi Power Co., Hattiesburg, Miss.	"The Advantages of Electric Cookery for Domestic Purposes"
Baines, Harold A.	New England Power Engr. & Service Corp., Providence, R. I.	"A Study of Customers' Voltage"
Baker, Ruth R.	Kansas City Power and Light Co., Kansas City, Mo.	"The Employee, the Mirror of Good Will"
Baldwin, Miles E.	Narragansett Electric Co., Providence, R. I.	"Advantages of Electric Cookery in the Home"
Barlow, John H.	Narragansett Electric Co., Providence, R. I.	"Electric Cooking"
Barrie, Claire	Pacific Gas and Electric Co., San Francisco, Cal.	"Our Twentieth Century Genie"
Barton, Williamson M.	Brooklyn Edison Co., Inc., Brooklyn, N. Y.	"Public Relations in the Electric Light and Power Industry"
Bean, Benjamin (See E. S. Miller)		
Bergmann, Walter, and Henry G. Wingardner	New York Edison Co., New York, N. Y.	"Deprecating Depreciation"
Birdseye, Harriette	Oklahoma Gas and Electric Co., Oklahoma City, Okla.	"Public Relations in the Electric Light and Power Industry"
Blake, George L.	Electric Bond and Share Co., New York, N. Y.	"The Electric Range a Necessity in the Home"
Blake, George L.	Electric Bond and Share Co., New York, N. Y.	"Applying Good Business Principles to Public Relations"
Bolton, George E.	New York Edison Co., New York, N. Y.	"Public Relations"
Bonn, Theodore	Electric Bond and Share Co., New York, N. Y.	"Frankness, Friendliness and Courage"
Booth, Robert Henry	New York Edison Co., New York, N. Y.	"Improved Relations with Better Understanding"
Boothman, Edwin Thomas	Brooklyn Edison Co., Inc., Brooklyn, N. Y.	"A Few Simple Thoughts on the Power Industry's Public Relations Campaign"
Bortz, Faye	Southern California Edison Co., Ltd., Santa Ana, Cal.	"The Advantages of Electric Cookery for Domestic Purposes"
Boyle, Raymond J.	New York Edison Co., New York, N. Y.	"Public Relations in the Electric Light and Power Industry"
Burnett, Newton O.	New York and Queens Electric Light and Power Company, Flushing, N. Y.	"Simplifying the Solution of Economic Problems Relating to Immediate Versus Deferred Investment"
Carey, James N.	New England Power Engineering and Service Corp., Providence, R. I.	"The Utilities New Deal"
Cassidy, John F.	Brooklyn Edison Co., Inc., Brooklyn, N. Y.	"Public Relations in the Electric Light and Power Industry"
Cave, Edward J.	Philadelphia Electric Co., Ardmore, Pa.	"The Modern Crusade"
Chapman, Nellie Mai	Southern California Edison Co., Ltd., Santa Ana, Cal.	"The Advantages of Electric Cookery for Domestic Purposes"
Chlanda, Charles	Central Hudson Gas and Electric Corp., Poughkeepsie, N. Y.	"Advantages of Electric Cookery for Domestic Purposes"
Clarke, Marie A. C.	Brooklyn Edison Co., Inc., Brooklyn, N. Y.	"Public Relations in the Electric Light and Power Industry"
Cleminson, Robert C.	Nebraska Power Co., Omaha, Neb.	"Importance of Public Relations in Solving Present Problems"
Coleman, Charles M.	Pacific Gas and Electric Co., San Francisco, Cal.	"An Open Door Public Relations Policy for the Electric Light and Power Industry"
Collamore, C. T.	Brooklyn Edison Co., Inc., Brooklyn, N. Y.	"Coordination of Feeder Outages"
Cope, Willard	Philadelphia Electric Co., Philadelphia, Pa.	"Giving the Public a 'We' Attitude Toward the Industry"
Coyle, Walter E.	Brooklyn Edison Co., Inc., Brooklyn, N. Y.	"Public Relations in the Electric Light and Power Industry"
Dannacher, Edward J.	Union Electric Light and Power Co., St. Louis, Mo.	"Public Good Will—Our Chief Asset"
Davis, L. M.	Pennsylvania Water and Power Co., Holtwood, Pa.	"Selection of a Suitable Method of Measuring the Discharge of a Hydroelectric Unit"
Day, Gordon H.	Utica Gas and Electric Co., Utica, N. Y.	"Public Relations"
Day, H. J.	Narragansett Electric Co., Providence, R. I.	"Public Relations"
Dermody, Bridget E.	United Electric Light and Power Co., New York, N. Y.	"Public Relations in the Electric Light and Power Industry"
DiSano, Joseph	New York Edison Co., New York, N. Y.	"Modernizing the Power of the Press"
Dixon, R. C.	Dallas Power and Light Co., Dallas, Tex.	"What the Public Reads, Sees and Hears"
Dooley, H. G.	Florida Power and Light Co., Miami, Fla.	"The Neighborhood Gimmick Company"
Doonan, James V.	New York Edison Co., New York, N. Y.	"Public Relations"
Duffy, Howard L.	Pennsylvania Water and Power Co., Holtwood, Pa.	"The Significance of Inspections"
Elwell, Maynard	Narragansett Electric Co., Providence, R. I.	"A Test Panel for A.C. Network Relays"
Ensminger, Harry	Pennsylvania Water and Power Co., Baltimore, Md.	"Public Relations in the Electric Light and Power Industry"
Eysink, Mary C.	Peoples Light Co., Davenport, Iowa	"Public Relations in the Electric Light and Power Industry"
Farnsworth, Dorothea M.	Edison Electric Illuminating Co., Boston, Mass.	"Advantages of Electric Cookery for Domestic Purposes"
Fibel, Adolph	New York Edison Co., New York, N. Y.	"Public Relations Engineering"
Fincke, Helen M.	Philadelphia Electric Co., Jenkintown, Pa.	"Facts and Fancies About the Electric Range in the Home"
Flavin, James M.	Syracuse Lighting Co., Inc., Syracuse, N. Y.	"Public Utility Depreciation in the Courts"
Flynt, William N.	Narragansett Electric Co., Providence, R. I.	"Public Relations and Tree Trimming"
Furber, R. D.	Northern States Power Co., Minneapolis, Minn.	"Inform Your Customers"
Gallagher, Mary P.	Narragansett Electric Co., Providence, R. I.	"Electric Cookery"
Geyer, Charles F., Jr.	Buffalo General Electric Co., Buffalo, N. Y.	"Advantages of Electric Cookery for Domestic Purposes"
Gouger, Bryan, and C. K. Jones	San Antonio Public Service Co., San Antonio, Tex.	"The Design of Low Cost Rural Lines"

Submitted by	*Employed by*	*Title of Paper*
Gray-Donald, E. D.	Quebec Power Co., Quebec, Can.	"Some Fundamental Considerations in the Study of Public Relations"
Greisser, Arthur H.	Portland General Electric Co., Portland, Ore.	"Fields of Research in Electric Utility Operation"
Griggs, Robbie M.	Alabama Power Co., Birmingham, Ala.	"Public Relations in the Electric Light and Power Industry"
Hackett, Fenton B.	San Joaquin Light and Power Corp., Fresno, Cal.	"Progress in the Power Industries Through Public Relations"
Hall, Leonard P., Jr.	New York Edison Co., Bronx, N. Y.	"Public Relations in the Electric Light and Power Industry"
Hallstein, Raymond J.	United Electric Light and Power Co., New York, N. Y.	"Advantages of Electrical Cookery for Domestic Purposes"
Hammil, Arthur V.	Narragansett Electric Co., Providence, R. I.	"Electric Cookery"
Harding, W. E.	New York Edison Co., New York, N. Y.	"A Key to Better Public Relations"
Harris, Franklyn L.	New York Edison Co., New York, N. Y.	"Public Relations in the Electric Light and Power Industry"
Hayde, Edward F.	Westchester Lighting Co., White Plains, N. Y.	"Public Relations in the 'New Era'"
Haynes, Minnie E.	Central Hudson Gas & El. Corp., Poughkeepsie, N. Y.	"Even 'Dad' Cooks"
Haynes, Minnie E.	Central Hudson Gas & El. Corp., Poughkeepsie, N. Y.	"They Are Not Fair"
Haynes, Minnie E.	Central Hudson Gas & El. Corp., Poughkeepsie, N. Y.	"Give the Accountant Visions"
Hayward, Harold W.	Narragansett Electric Co., Providence, R. I.	"The Political Football"
Heffernan, Miriam M.	Brooklyn Edison Co., Inc., Brooklyn, N. Y.	"Effecting Public Confidence"
Heikes, Neil E.	Public Service Co., Northern Ill., Chicago, Ill.	"Public Relations in the Electric Light and Power Industry"
Henderson, W. L.	San Joaquin Light and Power Corp., Fresno, Cal.	"Public Relations in the Electric Light and Power Industry"
Herndon, Brodie S.	Virginia Electric & Power Co., Richmond, Va.	"Recognize the Individual"
Holcomb, H. Sherman	Gloucester Electric Co., Gloucester, Mass.	"Public Relations and the Future of the Public Utility"
Hopwood, Mrs. J. L. R.	Philadelphia Elec. Co., Philadelphia, Pa.	"Women in Public Relations Work of the Light and Power Industry"
Horton, Marguerite M.	Narragansett Electric Co., Providence, R. I.	"The New Deal in Cookery"
Hush, Claude V.	Kansas Gas and Electric Co., Wichita, Kan.	"Public Relations in the Electric Light and Power Industry"
Hussong, H. O.	California Oregon Power Co., Medford, Ore.	"Help Wanted—Must Be Linguist"
Jackson, Elsie B.	Minneapolis Gen'l Elec. Co., Minneapolis, Minn.	"Electric Cookery, via the Grill"
Jacobus, T. C.	New York Edison Co., New York, N. Y.	"Public Relations in the Electric Light and Power Industry"
James, T. L.	Pacific Gas and Electric Co., Sacramento, Cal.	"Public Relations in the Electric Light and Power Industry"
Jannicelli, Frank P.	Public Service Elec. & Gas Co., Newark, N. J.	"Public Relations in the Electric Light and Power Industry"
Jenkins, Fred R.	Commonwealth Edison Co., Chicago, Ill.	"Public Relations"
Johnstone, Gladys H.	Brooklyn Edison Co., Inc., Brooklyn, N. Y.	"Advantages of Electric Cookery for Domestic Purposes"
Jones, C. K. (See Bryan Gouger)		
Kern, James S.	Brooklyn Edison Co., Inc., Brooklyn, N. Y.	"Advantages of Electric Cookery for Domestic Purposes"
Klainer, Joseph B.	Charles H. Tenney & Co., Boston, Mass.	"For Better Public Relations—Tell Your Story"
Klainer, Joseph B.	Charles H. Tenney & Co., Boston, Mass.	"How to Increase the Usefulness of the Accountant in the Electric Light and Power Industry"
Knees, Kathryn	Monongahela West Penn Pub. Serv. Co., Fairmont, W. Va.	"Public Opinion—A Pendulum"
Knights, Fred J.	Chicago District Elec. Gen. Corp., Chicago, Ill.	"The Accountant and the Continuous Inventory"
Krejci, Edward	New York & Queens Elec. Lt. and Pr. Co., Flushing, N. Y.	"A Study of Radial Secondaries and Low Voltage Networks"
Kuhles, Rhea M.	Detroit Edison Co., Mt. Clemens, Mich.	"An Advantage Story of Electric Cookery"
Labsap, A. H.	Washington Gas and Electric Co., Longview, Wash.	"Public Relations in the Electric Light and Power Industry"
Lacey, Jack	Tampa Electric Co., Tampa, Fla.	"Public Relations—Its One Foundation"
Lamb, T. S.	Carolina Power and Light Co., Raleigh, N. C.	"Public Relations"
Lehner, Marion L.	Brooklyn Edison Co., Inc., Brooklyn, N. Y.	"Advantages of Electric Cookery for Domestic Purposes"
Leonard, Thelma J.	Southern California Edison Co., Ltd., Santa Ana, Cal.	"Advantages of Electric Cookery for Domestic Purposes"
Lewis, Anne F.	United Electric Light and Power Co., New York, N. Y.	"Advantages of Electric Cookery for Domestic Purposes"
Lind, W. Earl	Delaware Power and Light Co., Wilmington, Del.	"Public Relations Begin at Home"
Lorch, Albert	Brooklyn Edison Co., Inc., Brooklyn, N. Y.	"The Electric Power Company and Man-Made Interference"
Ludens, John M.	Commonwealth Edison Co., Chicago, Ill.	"Public Relations in the Electric Light and Power Industry"
Lunde, G. A.	Northern States Power Co., Fargo, N. D.	"Our Public"
Mack, Bessie F.	Utica Gas and Electric Co., Utica, N. Y.	"The Advantages of Electric Cookery"
Makley, Louis W.	Dayton Power and Light Co., Dayton, Ohio	"Public Relations in Light and Power Industry"
Mathews, Hammond	Western Colorado Power Co., Durango, Colo.	"Public Relations"
McBath, E. L.	New York Edison Co., New York, N. Y.	"Advantages of Electric Cookery for Domestic Purposes"
McBride, Francis A.	New York Edison Co., New York, N. Y.	"Comparative Merits of Hydraulic and Fuel Plant Generation of Electricity"
McMillan, W. M.	Western United Gas and Electric Co., Aurora, Ill.	"High Bills a Source of Positive Customer Contacts"
McWeeney, Francis A.	Connecticut Light and Power Co., Hartford, Conn.	"How to Increase the Usefulness of the Accountant in the Electric Light and Power Industry"
Mead, John H.	Southern California Edison Co., Ltd., Pomona, Cal.	"Public Relations in the Electric Light and Power Industry"
Merkle, Edmund C.	Dayton Power and Light Co., Dayton, Ohio	"Public Relations in the Electric Light and Power Industry"
Messerich, Charles F.	Westchester Lighting Co., Yonkers, N. Y.	"Customer Relations and the Employee"

Submitted by	*Employed by*	*Title of Paper*
Miller, E. S., and Benjamin Bean	Kansas City Power and Light Co., Kansas City, Mo.	"Overturning of Tall Steel Poles and Their Foundations"
Miller, Charles W.	New York and Queens Electric Light and Power Co., Flushing, N. Y.	"The Need of the District Representative Plan in Metropolitan Utilities"
Moog, George C.	New York and Queens Electric Light and Power Co., Flushing, N. Y.	"Corrosion of Cable Lead Sheath"
Moore, Elizabeth J.	Carolina Power and Light Co., Asheville, N. C.	"It is Time for the Things That You Like!"
Morey, William E.	Brooklyn Edison Co., Inc., Brooklyn, N. Y.	"Public Relations"
Morford, B. J.	Northern States Power Co., Minneapolis, Minn.	"The Factors of Importance in Public Relations"
Mur, Adele G.	Electric Bond and Share Co., New York, N. Y.	"Advantages of Electric Cookery for Domestic Purposes"
Murtha, Mary E.	Brooklyn Edison Co., Inc., Brooklyn, N. Y.	"Public Relations in the Electric Light and Power Industry"
Nelson, E. Arnold	Minneapolis General Elec. Co., Minneapolis, Minn.	"The Non-Technical Employee and Public Relations"
Northrup, Frederick G.	Narragansett Electric Co., Providence, R. I.	"Advantages of Electric Cookery for Domestic Purposes"
O'Donnell, William W.	Narragansett Electric Co., Providence, R. I.	"Advantages of Electric Cookery for Domestic Purposes"
O'Keefe, Elizabeth	Southern California Edison Co., Ltd., Santa Ana, Cal.	"Advantages of Electric Cookery for Domestic Purposes"
Olds, Reginald G.	Brooklyn Edison Co., Inc., Brooklyn, N. Y.	"Public Relations"
O'Loughlin, John	Edison Electric Illuminating Co. of Boston, Boston, Mass.	"Public Relations in the Electric Light and Power Industry"
Olscen, Helen M.	Delaware Power and Light Co., Wilmington, Del.	"Public Relations in the Electric Power and Light Industry"
Olson, Reinhold S.	New York Edison Co., New York, N. Y.	"Prevention of Oxygen Corrosion in Boiler Plants"
Paige, Forrest V.	Edison Electric Illuminating Co. of Boston, Boston, Mass.	"Public Relations with Residential Customers"
Painter, James G.	Philadelphia Electric Co., Philadelphia, Pa.	"Public Relations in the Electric Light and Power Industry"
Partridge, Lloyd M.	Narragansett Electric Co., Providence, R. I.	"Winning Amicable Public Relations"
Perley, F. G.	New York Edison Co., New York, N. Y.	"Public Relations and the Sales Organization"
Pickells, Charles W.	New York and Queens Electric Light and Power Co., Flushing, N. Y.	"Voltage Surveys"
Potter, John H.	Indiana General Service Co., Muncie, Ind.	"Courtesy, the Way to Good Will"
Purdy, Margery	Alabama Power Co., Birmingham, Ala.	"Our Customer Relations"
Quad, Harold F.	Public Service Electric and Gas Co., Camden, N. J.	"Contemporary Public Relations"
Reis, Anthony J.	Brooklyn Edison Co., Inc., Brooklyn, N. Y.	"Warning Signals of Hot Bearings by Use of Thermostats"
Reynolds, Robert I.	Syracuse Lighting Co., Inc., Syracuse, N. Y.	"Public Acceptance of the Advantages of Electric Cookery for Domestic Purposes"
Riebeling, Magnus G.	Portland General Electric Co., Portland, Ore.	"Public Relations"
Ringler, George F.	Narragansett Electric Co., Providence, R. I.	"Operating and Test Experience with Porcelain Bushings"
Ripak, Mrs. E. Lillian	Electric Bond and Share Co., New York, N. Y.	"Efficient Cooking Modernisms"
Roberts, Thelma C.	Narragansett Electric Co., Providence, R. I.	"The Axe and the Tower"
Roll, E. E.	Detroit Edison Co., Detroit, Mich.	"Application of Machine Accounting Methods to the General Ledger and Financial Statements"
Rowley, Louis N., Jr.	Brooklyn Edison Co., Inc., Brooklyn, N. Y.	"The Consumer's Manual as an Instrument of Public Relations Policy"
Royce, Blanche A.	New York Edison Co., New York, N. Y.	"Public Relations in the Electric and Power Industry"
Runge, Walter W.	Public Service Elec. & Gas Co., Newark, N. J.	"Public Relations for Public Utilities"
Ryan, R. J.	Detroit Edison Co., Detroit, Mich.	"The Public be Damned"
Schencke, Florence N.	Pacific Gas and Electric Co., San Francisco, Cal.	"Public Relations in the Electric Light and Power Industry"
Schmid, Ad	Pacific Power and Light Co., Yakima, Wash.	"Current Diversion and the Customer"
Schmitt, Karl H.	Detroit Edison Co., Detroit, Mich.	"Air Conditioning and Its Relation to the Electric Light and Power Industry"
Schwarting, Milton	Wisconsin Public Service Corp., Manitowoc, Wis.	"How to Increase the Usefulness of the Accountant in the Electric Light and Power Industry"
Scott, Esther N.	Mississippi Power Co., Gulfport, Miss.	"Back of the Button"
Simmons, Ralph W.	Brooklyn Edison Co., Inc., Brooklyn, N. Y.	"Public Relations"
Skiriski, John J.	West Penn Electric Co., Pittsburgh, Pa.	"At Your Service, Public"
Smith, H. D.	Kansas Gas and Electric Co., Wichita, Kan.	"Let's Wed the Public"
Snow, Harry M.	Southern California Edison Co., Ltd., Inglewood, Cal.	"Public Relations in the Electric Light and Power Industry"
Snyder, R. H.	New York Edison Co., New York, N. Y.	"Factors of Rate Determination for Central Station Plants"
Steiner, Harold E.	New York Power and Light Corp., Albany, N. Y.	"Road to Understanding"
Svika, Henry J.	United Electric Light and Power Co., New York, N. Y.	"How to Increase the Usefulness of the Accountant in the Electric Light and Power Industry"
Taber, Leonard S.	Narragansett Electric Co., Providence, R. I.	"Conciliation as Applied to Public Relations"
Taylor, Grace L.	Kansas City Power and Light Co., Kansas City, Mo.	"Advantages of Electric Cookery for Domestic Purposes"
Terkoski, Walter J.	Syracuse Lighting Co., Inc., Syracuse, N. Y.	"Serve and Instruct the Public"
Thompson, James E.	Narragansett Electric Co., Providence, R. I.	"An Electric Frog for Trackless Trolleys"
Thompson, Josephine	Southern California Edison Co., Ltd., Santa Ana, Cal.	"The Advantages of Electric Cookery for Domestic Purposes"
Trimble, L.	Commonwealth Edison Co., Chicago, Ill.	"Public Relations in the Electric Light and Power Industry"
Truempy, C. Zahn	Brooklyn Edison Co., Inc., Brooklyn, N. Y.	"Cooperation is Success"
Turnbull, William	Detroit Edison Co., Detroit, Mich.	"Advantages of Electric Cookery for Domestic Purposes"
Tyson, John C., Jr.	Alabama Power Co., Birmingham, Ala.	"Sales Appeal for Electric Service"

Submitted by	*Employed by*	*Title of Paper*
Vandervelde, Harold	Commonwealth Edison Co., Chicago, Ill.	"Creating Public Good Will in the Electric Light and Power Industry"
Van Rye, O.	New England Power Engr. & Serv. Corp., Providence, R. I.	"The Employee's Part in Public Relations"
Vette, N. F.	Wisconsin Public Serv. Corp., Sheboygan, Wis.	"How to Increase the Usefulness of the Accountant in the Electric Light and Power Industry"
Wilson, Beatrice	Western United Gas & Electric Co., Aurora, Ill.	"The Advantages of Electric Cookery"
Wimer, Eldon R.	California Oregon Power Co., Roseburg, Ore.	"Advantages of Electric Cookery for Domestic Purposes"
Wingardner, Henry G. (See Walter Bergmann)		
Woll, Willard M.	Commonwealth Edison Co., Chicago, Ill.	"Central Station Service for Breweries"
Worthington, Frank R.	New Orleans Public Service, Inc., New Orleans, La.	"Public Relations in the Light and Power Industry"
Wright, C. N.	Indiana General Service Co., Muncie, Ind.	"Public Relations"

TAXATION AND LEGISLATION

(Continued from page 298)

the absolute necessity that the people of this state shall elect to the coming Legislature men and women who shall be tax-minded and who shall have ability, courage, character, and independence. They correctly pointed out that they are not interested in party politics and that it is really not material what may be the views of these candidates for the Legislature as to national politics. What the taxpayers need and must have if this state is to prosper is a legislative body elected next November which shall rank the highest of any legislative body ever elected in this state. We want men and women who will not be influenced by political patronage or possible appointment to some job by the Governor or anybody else, but men and women who will do their own thinking, who have intellectuality and independence, and the desire and courage to enact laws which shall be for the best interest of all the people of this state, and who will repeal some of the vicious legislation now on our state books.

At the present moment it seems probable that numerous initiated measures will be submitted to the electors at the coming November election, perhaps as many as 15 or 16. A few days ago, according to the press dispatches, a member of the State Tax Commission expressed some alarm over three of such possible initiated measures—one being an act to repeal the unpopular and discriminatory occupation tax law passed at the regular session in 1933; another being an act to exempt from taxation many thousands of residential properties and farm properties. Someone has estimated that if this act shall be adopted by the people that nearly one-half of the homes in the City of Spokane will be taken off the tax rolls. Another is an act strengthening the 40-mill limit law adopted by the people in 1932. I refer to this comment by a member of the State Tax Commission not by way of criticism, but solely for the purpose of emphasizing my point, that the people of this state, at the November election, will be obliged to pass upon numerous very important measures. Whether we like the initiative or not, as a means of legislation, such method is contained in our constitution and it is our duty to render all possible assistance in the way of education of the electors about these numerous measures.

You telephone men and all other utility men should not be tongue-tied. You owe this duty not only to yourselves and your companies, but also to your customers. What I would like to see done in this state at this time is the organization of 1000 or more study clubs. Numerous local community organizations could be used for this purpose. Others should be organized in every city, town, and community. These initiated measures and proposed amendments to the constitution should be debated in these study clubs. For that purpose the three great professions should be drafted—the ministry, the law, and medicine. School teachers, merchants, students of every class who are, or may become, familiar with the existing laws, and who will read and study and analyze these initiative measures, should be called in to take part in these debates. The meetings could be held in schoolhouses, churches, and other public places. If we are to legislate en masse, as provided by this initiative system, it is, of course, essential to good government that the vote shall be an intelligent vote. The vote should not be controlled by the titles of the respective acts or the headlines in the newspapers or by partisan politics, but by accurate knowledge and appreciation of the meaning of these respective measures and what good or harm will be accomplished if they are adopted. Democracy is on trial, and I submit it is your solemn duty as intelligent, fair-minded citizens in your respective communities to further such study clubs as I have mentioned for the sole purpose of educating all the people about these measures and solely in the interest of good government.

LIVE AND LET LIVE

(Continued from page 312)

tion to the purchaser. The bureau has been insistent that no restriction should be placed on the manufacturers which would place the specification merchandise which they were endorsing in any one price class.

Now, let us consider for a moment the position of the lamp manufacturer. He has been told that if he goes to the expense of bringing out merchandise which meets the I.E.S. specifications he will merit and *should receive* the wholehearted support of the utilities in marketing his product. Most of the portable lamp manufacturers have met this challenge splendidly. A large number have brought out models which meet the specifications and many more are modifying the design of their entire line to improve the lighting characteristics.

The utilities, and most especially those who merchandise portable lamps, must give these manufacturers support, or the splendid work started will be undone.

One suggestion that I would like to offer is to forget our "price complex." I don't mean that we should encourage or attempt extraordinary profit on this specification merchandise, although its superior value should be apparent. I do mean that we should appraise the value of the merchandise and then encourage prices which will give everyone a fair margin of profit—manufacturer, wholesaler or retailer. People outside the utility field will only interest themselves in our program as they see opportunities for profit. In the portable lamp field we are most emphatically in their hands. Let's live and let live.

POWER SALES ITEMS

AIR CONDITIONING

"Air Conditioner Paid for Out of Tomato Savings." Electrical World, August 11, 1934, pp. 177. McGraw-Hill Publishing Company, 330 West Forty-second Street, New York City.

By preventing the usual loss from drying out under atmospheric conditions an air conditioner installed in the tomato-ripening room saved its cost on a single car load of the fruit.

"Present Status of Air Conditioning." Electrical World, July 13, 1934, pp. 55-56. McGraw-Hill Publishing Company, Inc., 330 West Forty-second Street, New York City.

Summary of report of Air Conditioning Subcommittee of Edison Electric Institute just published by Chairman C. E. Michel of St. Louis.

"Conditioned Air in La Maison Francaise," by André Merle. The Electrical Journal, August, 1934, pp. 301-304. The Westinghouse Club, Publishers, 530 Fernando Street, Pittsburgh, Pa. New York Office 30 Rockefeller Plaza, Room 1734.

"Air conditioning" is often misleading. Some buildings are claimed to be air conditioned that but cool and dehumidify the air. But in La Maison Francaise the term is taken seriously to mean also the control of dust, odors, sound, vibration, ion content, and evenness of distribution.

DISTILLERIES

"The World's Largest Distillery—Hiram Walker & Sons, Inc., Peoria, Ill. Power Plant Engineering, September, 1934, pp. 398-406. Technical Publishing Company, 53 West Jackson Blvd., Chicago, Ill. New York Office, 171 Madison Avenue.

Built in less than a year, this distillery turns out 100,000 gallons of whisky a day. The power plant which burns 350 tons of coal a day has two 180,000 lb. per hr. pulverized coal fired boilers and two 1500 kw turbo-generators operating in parallel with the utility system on a power interchange agreement.

ELECTRIC MOTORS

"Which Motor? Which Control?" by George H. Hall. Electrical World, July 28, 1934, pp. 118-121. McGraw-Hill Publishing Company, Inc., 330 West Forty-second Street, New York City.

In an article which appeared in the Electrical World of June 16th, Mr. Hall reviewed the essential factors for study in the application of electric motors. In this discussion he reviews the available types, gives the characteristics and shows how controls may be used to modify them to fit the motor to the specific service required. The article is a practical semi-technical approach to the selection of modern motors and controls and should be of interest to the user, the power company and the manufacturer.

"Part-Winding Starting Prevents Objectionable Voltage Fluctuations," by Homer W. Forschner. Electrical World, August 11, 1934, pp. 184-185. McGraw-Hill Publishing Company, Inc., 330 West Forty-second Street, New York City.

Starting is an acute problem with two big synchronous motors operating as a large part of the load at the end of a long transmission line especially when the line in question also supplies general service to many customers. The ingenious solution adopted for this paper mill grinder drive may well find application with other large industrial motor users.

ELECTROLYTIC RECTIFIERS

"The Use of Power Rectifiers in the Electrolytic Manufacture of Hydrogen," by L. W. Morton and J. W. Case. General Electric Review, August, 1934, pp. 358-363. General Electric Company, 1 River Road, Schenectady, New York, Publishers.

Recent developments in electrolytic rectifiers have resulted in their application to industrial processes. The Consolidated Mining & Smelting Company of Canada, Ltd., are using apparatus of this type to supply 10,000 amps at a voltage of 650. By the use of this equipment, smelting companies are able to use sulphuric acid, which is a by-product of the smelting process, in the manufacture of artificial fertilizer. In order to obtain a relatively smooth direct current after rectification, transformer connections are utilized which give 12 phase current at rated voltage on the primary side. The advantages of rectifier equipment over synchronous converters consist of ease of installation, noiseless operation, inherent non-reversible polarity, and in voltages above 600 increased efficiency.

LIGHTING

"What the States Require in Industrial Lighting," by E. J. Poor. Electrical World, August 4, 1934, pp. 135-136. McGraw-Hill Publishing Company, Inc., 330 West Forty-second Street, New York City.

A recommendation is made for education rather than legislation so that industrial lighting standards are raised to the proper level. The desirability of recognizing the economical value of light rather than a mere adherence to legal limits is stressed.

LOAD BUILDING

"San Joaquin's Adventure in 'Free Electricity'," by A. E. Wishon and H. H. Courtright. Electrical World, August 11, 1934, pp. 167-169. McGraw-Hill Publishing Company, Inc., 330 West Forty-second Street, New York City.

The San Joaquin Light and Power Corporation presents the results of an experiment which involved giving free electricity to its consumers during the months of May and June. These results are highly interesting, embracing as they do customer reaction, trade relations and load increase.

MOTOR GENERATOR SETS

"Dual-Output Generator Solves a Shovel Problem," by D. Stoetzel. Electrical World, August 4, 1934, pp. 152-153. McGraw-Hill Publishing Company, Inc., 330 West Forty-second Street, New York City.

The author of this article sets forth the practical solution for using motor generator sets in connection with electric shovels. The dual purpose generator has been developed for this type of equipment which saves space for the manufacturer and maintenance for the operator. The compactness of the motor generator set offers possibilities for other applications.

PIPE LINE PUMPING

"Diesel Electric Pipe Line Pumping Stations," by L. M. Goldsmith. Diesel Power, August, 1934, pp. 427-430. Business Journals, Inc., 192 Lexington Avenue, New York City, Publishers.

This article describes the Silsbee pipe line pumping station on the East Texas Line of the Atlantic Pipe Line Company, and gives some operating costs and shows comparative efficiencies of centrifugal pumps operating at reduced speed versus throttled discharge valve.

RAILROAD ELECTRIFICATION

"Railroad Electrification — New Style." Electrical World, July 21, 1934, pp. 71-72. McGraw-Hill Publishing Company, Inc., 330 West Forty-second Street, New York City.

A report of an interview with Ralph Budd, President of the Burlington Lines, whose new "Zephyr" train is making railroad history, is presented. A comparison between central station operated electrified railroads and electrification through internally mounted prime movers and generators is given.

REFRIGERATION

"Truck Refrigeration Adds an Off-Peak Electric Load." Electrical World, July 28, 1934, pp. 115. McGraw-Hill Publishing Company, Inc., 330 West Forty-second Street, New York City.

An additional off-peak load has been added to many lines through application of stored refrigeration to ice cream and other refrigerated trucks.

REVERSED REFRIGERATION

"Hot Water from Reversed Refrigeration," by B. J. Homkes. Electrical World, August 4, 1934, pp. 140-142. McGraw-Hill Publishing Company, Inc., 330 West Forty-second Street, New York City.

One of the more unusual innovations at the "Home of Tomorrow" of the Westinghouse Company at Mansfield, Ohio, is the use of reversed cycle refrigeration for the hot water supply. Ten gallons per hour of 148 degrees Fahrenheit water for the average power input of 1 kilowatt are obtained.

SECTIONAL DRIVE

"Sectional Electric Drive Saves in Paper Making." Electrical World, August 4, 1934, p. 139. McGraw-Hill Publishing Company, Inc., 330 West Forty-second Street, New York City.

Large savings with small additional outlay for sectional drive are indicated.

Electricity Supply in Great Britain and the United States

(Continued from page 294)

is indicative of relative prices of electricity in Great Britain and in the United States.

Wholesale Tariffs

Wholesale tariffs for the British Grid vary in different districts according to local cost factors. The mid-east England tariff sets up (a) a service charge, (b) a fixed kilowatthour charge in respect of each point of supply, and (c) a running charge. The service charge depends upon the number of points at which electricity is taken from the grid. The fixed charge in the mid-east England grid tariff reads as follows:

For each kilowatt of maximum demand on the Board in the year, being part of the basic demand, the sum of	£3 10s 0d
For each kilowatt of maximum demand on the Board in the year, being part of the first standard increment of demand, the sum of	£3 5s 0d
For each kilowatt of maximum demand on the Board in the year, being part of the second standard increment of demand, the sum of	£3 0s 0d
For each kilowatt of maximum demand on the Board in the year in excess of the basic demand, and two standard increments of demand, the sum of	£2 15s 0d

The running charge or kilowatthour charge for the mid-east England area in 1932 was 0.186 pence or about 0.37 cents per kilowatthour. There are coal adjustment clauses, definitions of demand and similar provisions in this tariff. In the United States the larger electric light and power companies sell at wholesale to many municipal distribution systems and to a considerable number of smaller companies. The wholesale rates in America and in Great Britain are quite comparable in form. In amount they vary according to costs in the different sections.

Contrast of Government Policies

The policy now being followed by the British Government as outlined in the Electricity Supply Acts of 1919 and 1926 and reports of the Electricity Commissioners and the Central Board of Electricity is in certain respects in striking contrast with the policy now being followed by the United States Government in its program of power development. The British Government, to a considerable extent copying from the experience of large privately operated systems in America, has established a system of interconnection for the purpose of cutting down investment in generating facilities by reducing the necessity for reserve equipment and discouraging unnecessary duplication. It requires that all plans for the establishment of new generation stations or the extension of existing ones shall be submitted to and approved by the Government.

To the contrary, the United States Government is itself now engaged in building large power plants in areas where surplus generating capacity of the order of 50 per cent is now installed, and the government power projects will increase these excesses very considerably, providing two to four times as much capacity as the load reasonably to be expected in those areas will require.

In a second respect the position of the two governments is different. The tariffs or rates for electric service recommended by the British Government contain a substantial service charge element, which is designed to insure a fair return on the capital investment required to render service to all customers. The Tennessee Valley Authority has prescribed retail rates which provide for a comparatively low minimum bill and top steps so low that customers will be served at a loss unless their use of electricity is increased five times above the present average use in the United States and two or three times above the present use in areas in the United States where low rates have been available for many years. The British type of rate much more nearly fits the economics of the business of power supply than does the TVA rate.

In a third respect the present operations of the British and the United States Governments are at variance. The Tennessee Valley Authority fixes a retail rate for distributors of electricity as a condition in its contract for the wholesale supply of electricity to a community. A committee appointed by the Electricity Commission of the British Government has formulated a recommended retail rate for electricity, but the 1926 report of the committee appointed by the Ministry of Transport to review the national problem of the supply of electric energy stated, "The retail distribution of electric energy, its sale, transport and delivery, is essentially a local matter and a suitable function for decentralization," and up to the present time this is the policy of the British Government.

STEAM GENERATION—1934

E.E.I. Pub. B8. A report of the Prime Movers Committee, Edison Electric Institute, 32 pages. Price 60 cents to members and their employees; $1.50 to non-members in the U.S.A.; $1.60 to foreign countries.

This report contains statements by Operating Companies and Manufacturers on:

- Burning Fuel Oil in Coal Fired Boiler Furnaces
- Stokers
- Pulverized Fuel Equipment
- Stack Gases
- Boiler Water Circulation
- Water Gages and Columns
- Carry-Overs of Moisture and Solids in Steam
- Feed Water Treatment
- Procedure for Laying-up Equipment

SLIM

(Continued from page 311)

be admitted to their charmed coterie. In the course of 414 pages "Slim" passes from callow youth to sophisticated youth, and then, tempered by tragedy, to a hard and competent manhood.

The book is full of sound and action. The steel clangs as the towers spring up along the right-of-way. Winches strain and the "bull line" rattles in the blocks as the high tension lines are threaded from tower to tower, and finally there is the epic of railroad yards full of "hot wire" and hardy line crews. It is no bed time story, but one in which men battle with steel and copper, with sleet and gale, and between times battle with each other.

No one who reads "Slim" can ever look with indifference on the steel filagree of tall towers and the long festoons of heavy wire hanging from the clustered insulators.—L. O.

"OUR NEW POOR RELATIONS"

(Apropos the Central Electricity Board)

"Sir Andrew Duncan's Sea-Fish Commission has issued its first report. It sounds familiar to electric supply engineers. There is to be a Central Herring Board, and eight area committees. There are too many boats; it is proposed to reduce the number, and to allocate the load between selected boats and super-boats. For this purpose Government capital will be needed. Everyone will work under license, and coordination on a national basis will replace individualism, both in production, transmission and distribution. It is thus hoped to increase the annual sale of fish units. Transformation will also receive attention; we may expect in time standardization of the kipper. Finally, there will be a levy on the industry to provide for the financial needs of the Board. The fisher of tomorrow will have much in common with the supply engineer."—*Electrical Times, London, Aug. 30.*

THE "POWER SPECIALIST" CROSSES THE BORDER

Editorial from *Electrical News and Engineering*, Toronto, Ontario, Can.

Over the past few years we have heard many complaints from manufacturing concerns and even from municipalities as to the activities of a so-called "power cost specialist" who, as far as we can learn, is not a qualified electrical engineer. It appears that this "specialist" has been going around Ontario collecting large fees from power users and, as far as we can ascertain, has been unable to justify his work. His procedure is to interest the power user in saving money on his power bills, obtaining as early as possible a retainer or advance payment on his fees. In many cases when his clients were not satisfied with the progress or the type of reports made by the self-styled "power cost specialist" they had difficulty in getting back their books, contracts, bills, etc., and in some cases, could only get them on payment of a sight draft.

Our purpose in warning the industry of this specialist's activities is because we consider that his operations have done considerable harm to the progress of the industry.

In the first place, his method of procedure is such as to impair the friendly relations existing between consumer and supplier. By suggesting and trying to prove that the electric utility's method of billing is at fault, a situation is created which is not conducive to the growth and expansion of electric facilities in the utility's district. Furthermore, the reports made by this "specialist" have not, to our knowledge, been substantiated.

Secondly, after a manufacturer or utility has employed this "power cost specialist" they are wary about employing the services of a bona fide electrical engineer. This is serious, for well-qualified engineers are thus discriminated against. We would like to point out, however, that this power cost specialist has not claimed to be an electrical engineer and as far as we can learn has taken no recognized engineering course at any university or school of engineering in Canada, nor does he belong to any of the professional engineering associations. The fact remains, however, that the public does associate a "power cost specialist" with an electrical engineer, as the latter is recognized by his qualifications and training as being capable of making analytical studies on power costs. In fact, it is necessary to be a qualified electrical engineer in order to make a qualified complete analytical report of power conditions for any plant or system.

Take the case of a professional electrical engineer in a consulting practice who, for many years, has been employed on power cost work. Much of his work has necessarily been in reducing power costs for large manufacturers. This work has had the stamp of approval of (1) the industry; (2) the consumer; (3) the electric utility. It consists briefly in advising the consumer how to use and buy electric power economically. This generally means making engineering surveys showing how the consumer can operate his electrical apparatus efficiently all the time in order to reduce his maximum demands (peaks) and improve his power-factor and thus escape penalties on his power bill. Surely it is evident that only a trained electrical engineer can do this.

The whole situation evidently demands that some legislative action be taken in order to protect the public and the professional engineer.

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CONVENTIONS AND MEETINGS

SEPTEMBER

5-7 Pennsylvania Electric Association, Bedford Springs, Pa.
10-11 Wisconsin Utilities Association, Commercial Group, Pfister Hotel, Milwaukee, Wis.
10-12 Rocky Mountain Electrical Association, Estes Park, Colo.
18-20 Association of Iron and Steel Engineers, Cleveland, Ohio.
19-29 National Electrical Exposition, Madison Square Garden, New York, N. Y.

OCTOBER

1-5 American Welding Society, Hotel New Yorker, New York, N. Y.
5-6 Empire State Gas and Electric Association, Westchester Country Club, Rye, N. Y.
11-19 Economic Conference of Engineers, Stevens Institute of Technology, Johnsonburg, N. J.
17-20 National Electrical Manufacturers Association, Chicago, Ill.
22-23 Prime Movers Committee, EEI, Edgewater Beach Hotel, Chicago, Ill.
22-23 Transmission and Distribution Committee, EEI, Edgewater Beach Hotel, Chicago, Ill.
25-26 Electrical Equipment Committee, Edgewater Beach Hotel, Chicago, Ill.
29-31 American Gas Association, Auditorium, Atlantic City, N. J.

NOVEMBER

12-15 National Association of Railroad and Utilities Commissioners, Willard Hotel, Washington, D. C.

DECEMBER

3-4 National Industrial Council, Waldorf Astoria Hotel, New York, N. Y.
3-8 Eleventh National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York, N. Y.
5-6 Congress of American Industry and 39th Convention of National Association of Manufacturers, Waldorf Astoria Hotel, New York, N. Y.

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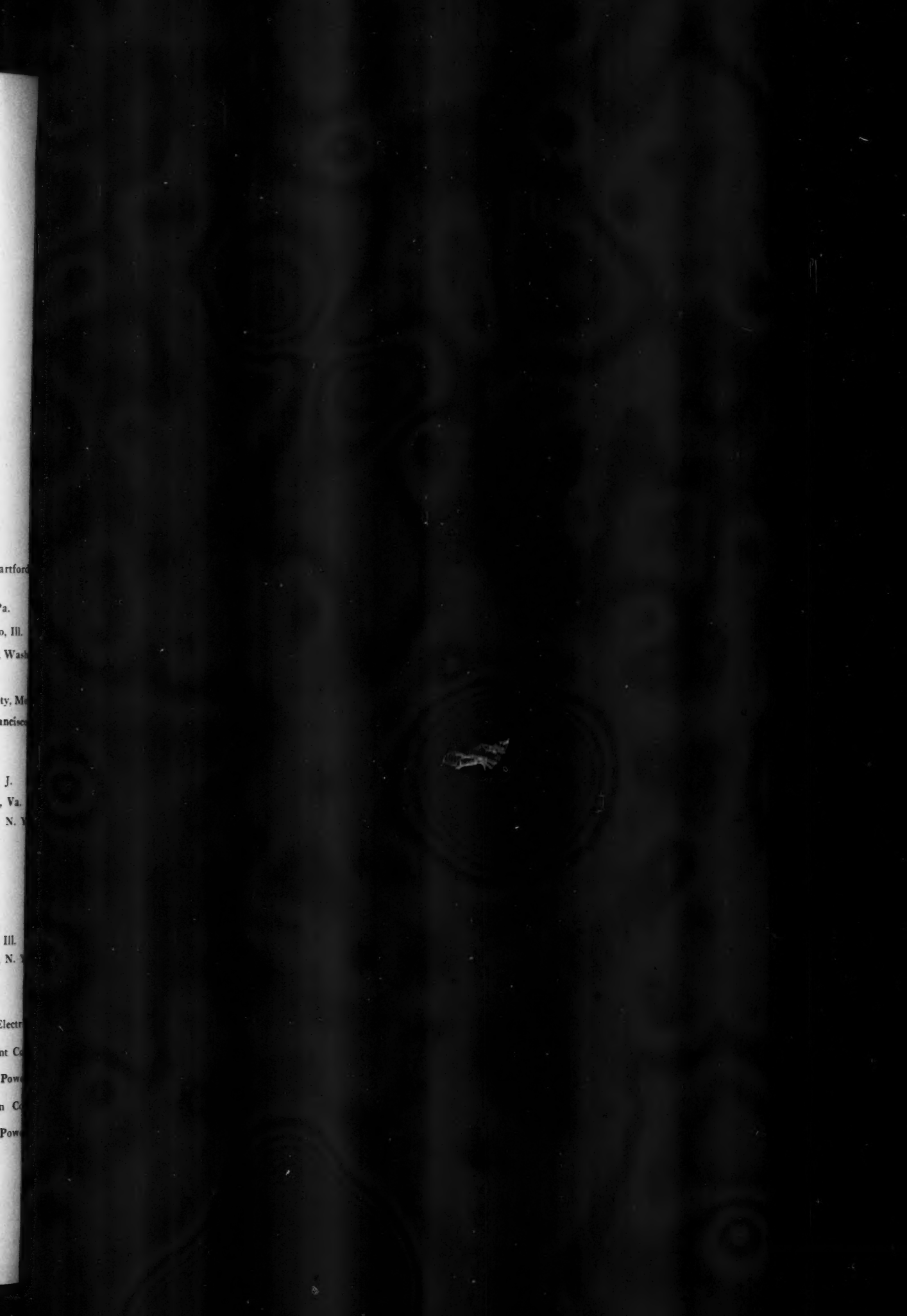
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